Construction Methods

JANUARY 1947

Sinking an Open Caisson

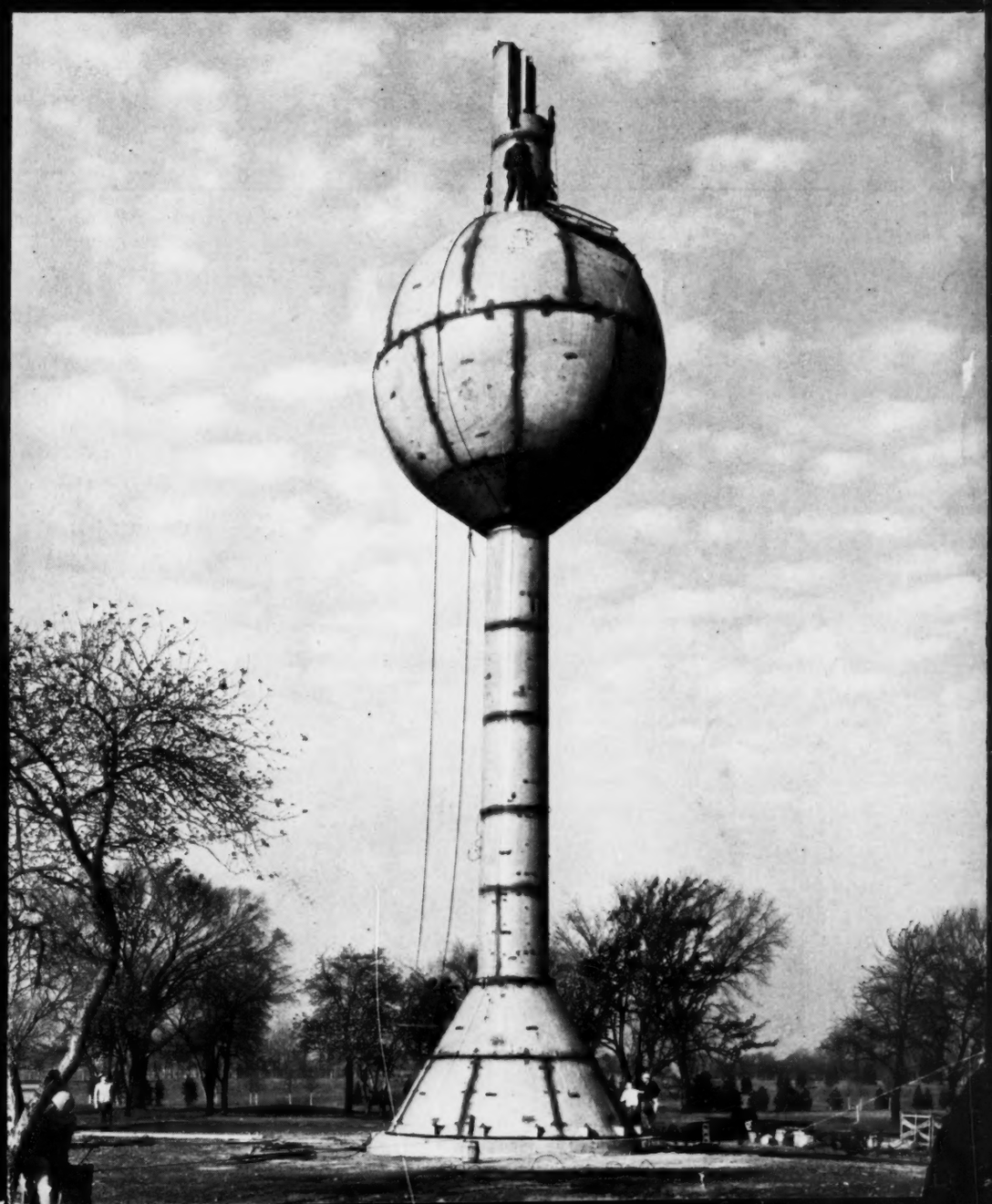
Casting and Driving 117-Ft. Concrete Piles

Building Floors Poured from Top With Descending Forms

Causeway Built With Precast Units

Grid Sheet Bracing Protects Deep Cut Banks

ACCOUNTING FOR CONTRACTORS
FIFTH OF A SERIES



RESEMBLING a golf ball on a tee is this country club water-sphere, erected by fabricating globular tank around base of circular riser, then hoisting tank to top.

JR v.291 Jan.-June 1947

Use Hi-Bond Bars for fast and secure placement*

Placing of reinforcing steel is done more speedily and securely with HI-BOND bars. The helical ribs dovetail so well at intersections that the simplest wire tie will hold HI-BOND bars firmly fixed even in difficult wall positions. When HI-BOND Concrete Reinforcing Bars are tied in position they easily support a heavy man. The saving in time, labor and wire makes possible more economical construction.

With HI-BOND, deflections in beams are reduced, width of cracks is minimized, and the possibility of steel corrosion is less. When spliced, they will develop their tensile strength in splices with a shorter lap than commonly used. Irrespective of the position in which they are cast HI-BOND bars provide a greater mechanical grip in the concrete and, therefore, offer higher resistance to slippage. All these advantages result in better, stronger, more efficient installations—no premium is assessed for HI-BOND'S improved design—when you specify HI-BOND *you get* extra value at no extra cost.

Write for bulletin.

Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.,
Sales Offices: Cincinnati, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul. *Principal Products:* Bars, Structurals, Plates, Sheets, Strip, Tin Plate, Floor Plate, Piling, Reinforcing Bars, Rails, Track Accessories.

* Reg. U. S. Pat. Off.

INLAND HI-BOND

CONCRETE REINFORCING BARS

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McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York (18)

Construction Methods

The Construction Magazine With Picture Power

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ABC **JANUARY, 1947** ABP
Volume 29 Number 1

Cuts and Fills

HOUSING enters the realistic stage with release of most of the controls that proved to be a hindrance instead of a help to the program. In assuming the office of Housing Expediter, Frank R. Creedon issued a sensible statement upholding the program's objective of rapidly and adequately housing the veterans while recognizing the practical aspects of the current building situation. A hustling construction man who had a lot to do with building the Oak Ridge atomic bomb plant, Frank Creedon should make the housing plan click if anyone can.

* * *

PORTENT of a bidding tragedy appears as a plaintive note carried by a recent issue of the Iowa AGC's "Central Constructor": "Whatever contractor got those cheap pipe prices last Saturday had better get in touch with the Prairie City Concrete Products Co. again. It seems that the boss was at a football game, the prices weren't right, and the name of the inquirer has been misplaced."

* * *

REPORT from the Ford News Bureau states that: "Enough blueprint paper was used in drawing of specifications for a new Ford model to cover the highway from Detroit to Columbus, Ohio, and return." Don't be surprised if some materials-hungry highway engineer grabs on to this idea for paper-paved roads.

* * *

MAYBE paper won't do, but some material will have to be applied, and sooner better than later, to 27,000 mi., or 14 percent, of the Federal Aid System in urgent need of resurfacing and to remove hazardous conditions, according to the Public Roads Administration. Looks as if the road builders will be mighty busy this year.

* * *

NO LONGER will engineering and technical books be dateless, for McGraw-Hill Book Co. has just announced a new policy of labeling each book as to date of publication or last revision in forthcoming catalogs.

* * *

CONSTRUCTION METHODS was founded in 1919, under the name of SUCCESSFUL METHODS, by the Manufacturers Publicity Bureau, Inc., of Chicago, representing a group of non-competing manufacturers of construction equipment. Charles R. Thomas, editor of the first few issues, was succeeded by William Jabine.

In 1926 the McGraw-Hill Publishing Company, Inc., of New York purchased the publication, changing its name to SUCCESSFUL CONSTRUCTION METHODS in November of that year, to CONSTRUCTION METHODS in May, 1927, and to CONSTRUCTION Methods and Equipment in December, 1936. In October, 1939, the name CONSTRUCTION METHODS was resumed. All rights to the foregoing titles are reserved by the publishers.

Robert K. Tomlin was appointed editor of CONSTRUCTION METHODS in January 1928 and was succeeded by Waldo G. Bowman in January, 1946.

HERE'S HOW IN THIS ISSUE

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FIFTH OF A SERIES OF ARTICLES—p. 96

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JAMES H. McGRAW, Founder and Honorary Chairman

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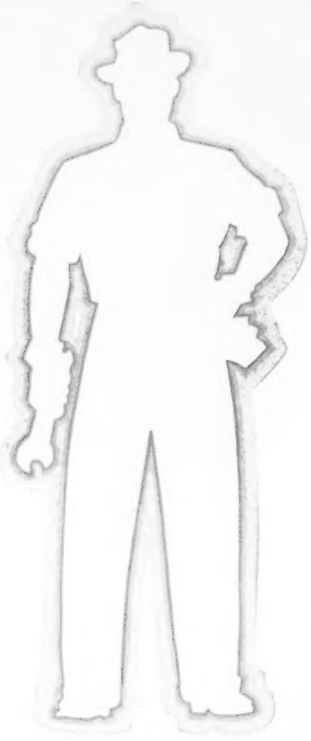


Meet

WHO IS HE?

When a business succeeds, it usually grows. This growth calls for a more complex system of management and, often, more widespread ownership.

Take a company like Allis-Chalmers, which has grown and progressed for 100 years. Just who is Mr. A-C? Because the answer to a question like that is complex, it is easy for people to pick up mistaken impressions.

For the sake of the record, let's take Mr. A-C apart and see who he really is.

WHO IS CAPITAL?

Capital doesn't wear a silk hat at Allis-Chalmers. "Capital" consists of 23,100 stockholders who own an average of less than 110 shares each. Mr. Capital might be a grocer, a farmer, a widow, a school teacher, or YOU. He might be a company employee in the office or shop or an officer of the company.

No one individual or family owns more than ½ of 1 percent of the total stock of Allis-Chalmers. This is an example of democratic ownership distinctive in the history of large corporations.

WHO IS MANAGEMENT?

Management is the guiding hand (or head) hired by the owners to make an organization tick — and click! Management coordinates the efforts of individuals and sets the direction the company travels.

Who is Mr. Management at Allis-Chalmers? Not just the officers and division heads of the company. Management is the salesman in the territory, the foreman in the shop.

Management is every employee from errand boy to president who contributes by word and deed to the progress of the company.

Speaking of errand boys, two of the top officers of Allis-Chalmers started with that job. Two others started as salesmen in the field. Two others as student engineers. All Allis-Chalmers officers know the business from the ground up — through experience with the company.

Mr. Management doesn't wear a high wing collar at Allis-Chalmers. Neither does he have any monopoly on his job.

WHO IS LABOR?

The man who works in the shop is spoken of in the newspapers as "labor." Actually, he may be a skilled craftsman, as much a master of his trade as a dentist or a surgeon.

Actually he may be a part of *Management* by reason of some suggestion he has made to improve a process or a product.

Actually he may be a part of *Capital* through ownership of company stock.

The fact that he works with his hands makes him no less a part of Allis-Chalmers than the man or woman who works at a desk. The terms "Capital," "Management," and "Labor" are indefinite and overlapping. Many a man who works in the shop is actually a part of all three groups.

Introducing Mr. A-C

Who then *is* Mr. A-C? He is a combination of 23,100 stockholders, 25,000 employees, nearly 5,000 dealers and their employees, and more than 10,000 suppliers who furnish in excess of 100,000 separate items for manufacture.

He symbolizes a company in which no individual or family owns more than ½ of 1 percent of total stock.

His is a company which contributes something to better living in nearly every home in America — in supplying machines to grow and process food, generate electricity, pump water, build roads, produce building materials.

Quite somebody, Mr. A-C! A potent contributor to the welfare and livelihood of millions of people. It takes the right hand, left hand, head, heart and pocketbook to achieve such results. No one part of him can do the job alone.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

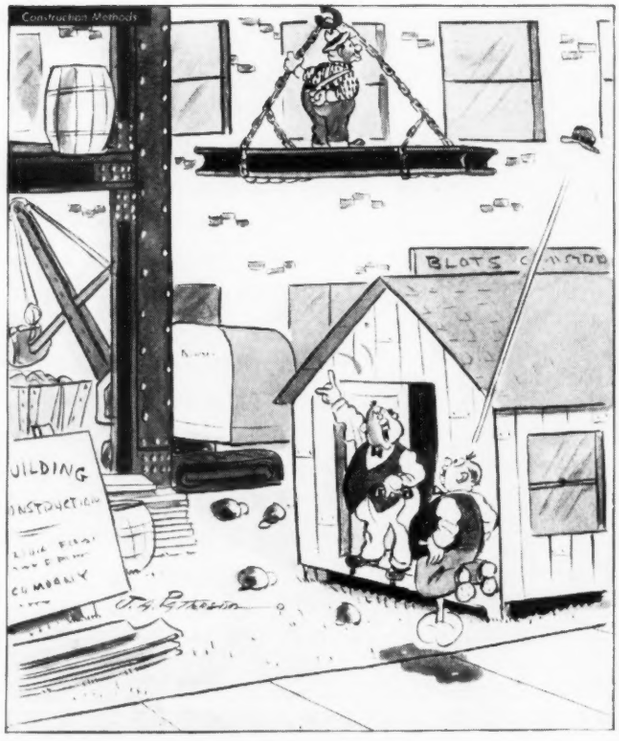
2-CYCLE DIESEL CRAWLER TRACTORS • MOTOR GRADERS
POWER UNITS • INDUSTRIAL WHEEL TRACTORS

THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS

"All right, Shupe, I can tell when you're gold-bricking."

"I guess it runs in my family. My old man was a dentist."



"Some lady on the phone next door complaining of a peeping Tom again."

Operation Zero!
'INCOR' CUTS WINTER COSTS IN HALF
IT takes a well-planned campaign to defeat the Building Trades' age-old enemy—*Winter*. It can be done, has been done, ever since 'INCOR', America's FIRST high early strength portland cement, made year-around concreting economically feasible. And "economic feasibility" never meant such big economies as it does right now. Just figure at today's costs what it means to save two days' heating fuel and labor on each pour and at the same time cut form and tarpaulin costs in half. Plan it with 'Incor'* 24-Hour Cement...keep job speed up, job costs down. Write for copy of "Cold Weather Concreting." Address Lone Star Cement Corporation, 342 Madison Avenue, New York 17.
*Reg. U. S. Pat. Off.
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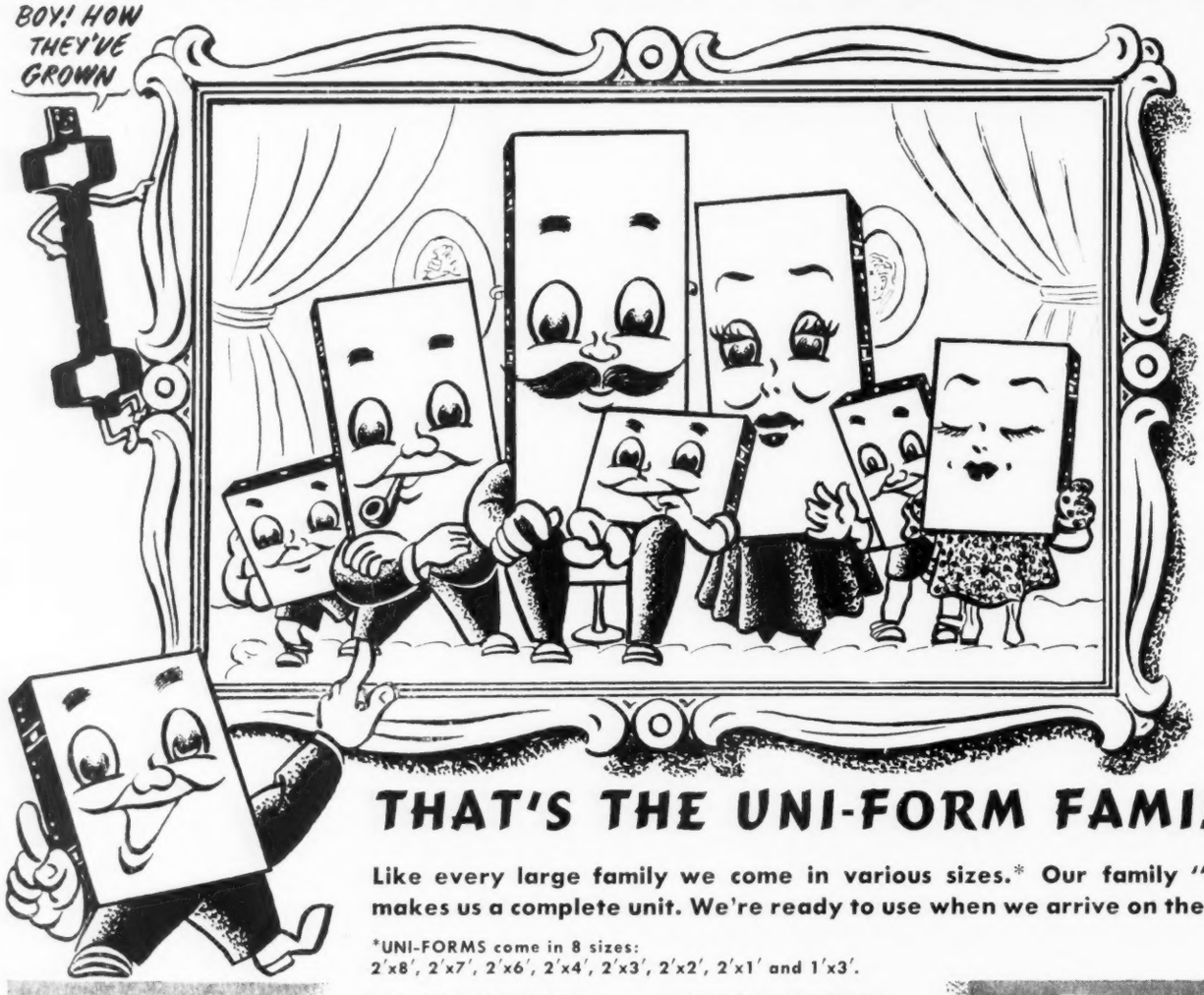
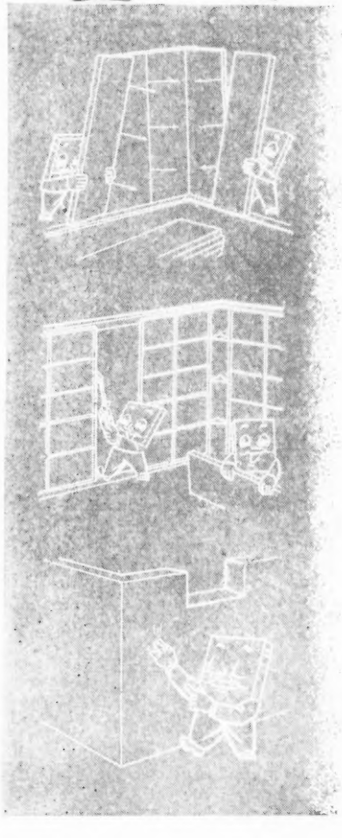
Notice the Resemblance?



THAT'S THE UNI-FORM FAMILY!

Like every large family we come in various sizes.* Our family "Tie" makes us a complete unit. We're ready to use when we arrive on the job.

***UNI-FORMS come in 8 sizes: 2′x8′, 2′x7′, 2′x6′, 2′x4′, 2′x3′, 2′x2′, 2′x1′ and 1′x3′.**



• FAST, EASY ERECTION

UNI-FORMS are faster, easier to erect and align because, assembled with the UNI-FORM Tie, they lock panels into a rigid unit, requiring alignment on one side only. No nailing — no bolting — no job assembly. They're ready to use.

• EASY TO STRIP

Remove one side alignment—remove Tie Keys from the Ties and strip the forms. They're ready for the next use.

• SMOOTHER, BETTER CONCRETE

UNI-FORMS always produce smooth-surfaced, ready-to-use concrete. Milled Tie slots assure tight joints, minimize finishing costs.

• UNIFORM THICKNESS

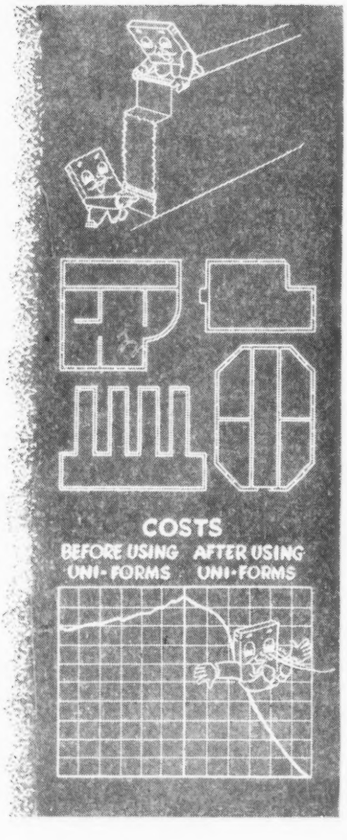
UNI-FORM Ties lock and accurately spread forms—assure uniform thickness. No seepage—no bulging—no "lost" concrete.

• FLEXIBILITY

UNI-FORMS are "ambidextrous"—they member horizontally or vertically in any position. They're used on straight, curved or irregular walls — any height, width or length.

• AN ENGINEERED SYSTEM REDUCES COSTS

The UNI-FORM System has no "bugs"—it is a proven system which eliminates the usual time and cost consuming "guesswork". Every possible need has been provided for in this faster, better method of forming concrete.



UNI-FORMS ARE RENTED OR SOLD

Over 3,000,000 square feet now in use.

Write for Catalog

UNIVERSAL FORM CLAMP CO.

FOUNDED 1912

Concrete Form Specialists for 34 Years

1244 North Kostner **Chicago 51**

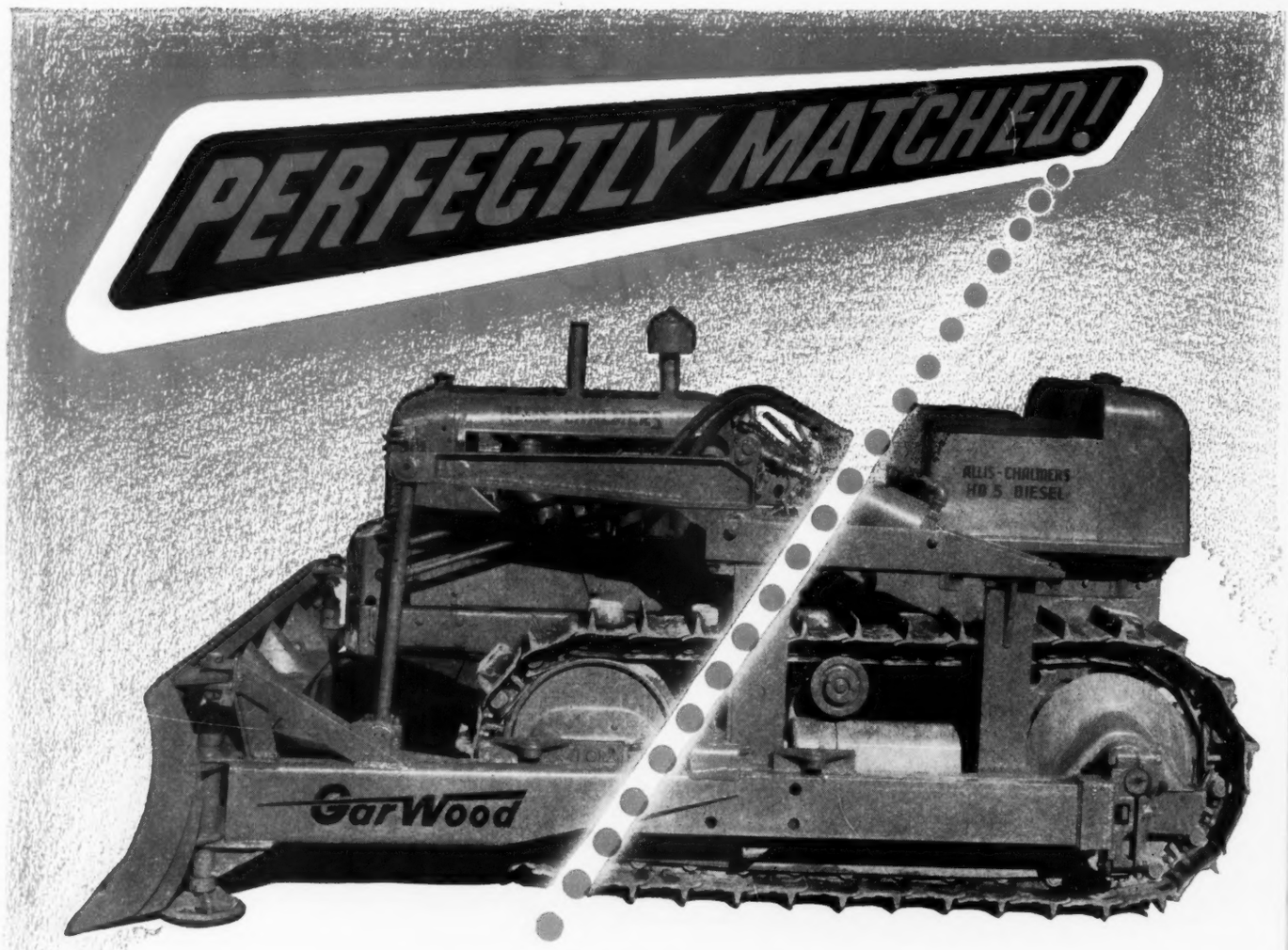
Using 4 Rear-Dump Euclids to haul from the loading pit to plant, The Grove Stone and Sand Co. of Swannanoa, North Carolina, is producing an average of 200 tons of sand and gravel every hour. Loaded with 15 tons of material by a 1¾ cu. yd. dragline, the Euclids make 4 to 5 trips per hour on the one and one-half mile cycle.

Several years ago the company purchased some early model Rear-Dump Euclids that had seen heavy service on the Sky-Line Drive and other tough construction jobs in the vicinity. Superior performance of this equipment over the hauling units previously used led to replacement with new Euclids when it became necessary to double plant production.

Of this hauling fleet, Mr. J. G. Northcott, General Manager, says, "Our Euclid trucks are just about the most efficient and dependable equipment we've ever owned."

If you need hauling equipment for earth, rock, coal or ore, your Euclid Distributor or Branch will provide helpful facts and figures on the models best suited to your requirements.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio



FOR THE BRAND NEW ALLIS CHALMERS HD-5 TRACTOR

Specially Designed and Balanced Equipment by GarWood

When it comes to *real*, down to earth *engineering* in small packages . . . you just can't beat the brand new, *specially* designed and balanced Gar Wood Equipment for the new Allis Chalmers HD-5 Tractor.

For here is a combination that's engineered and built expressly for *years* of dependable, rugged, smooth-functioning *work*. Perfectly-balanced earth-moving *brawn* that means more profit to you! And what's more . . . it's a combination that's *built to take a beating* . . . under the *worst* possible conditions . . . on the toughest jobs!

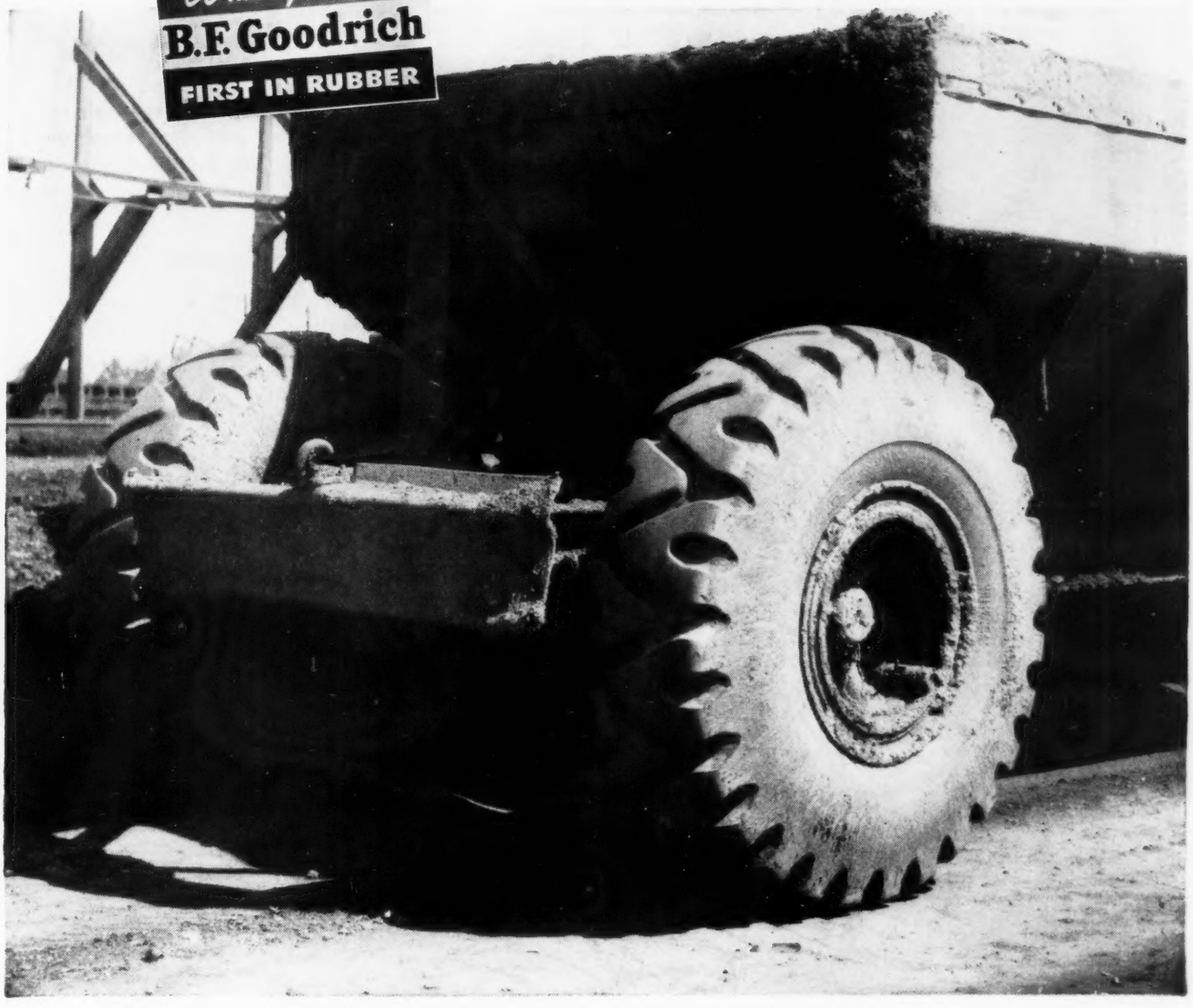
Want proof? Ask the men who've been using Gar Wood Road Building Equipment all over the world. Ask *them* about Gar Wood quality and dependable operation *when and where it counts.* Then consider: this is newly designed, exactly-engineered, quality-built Gar Wood Equipment.

And then . . . for your own good . . . specify Gar Wood!

GAR WOOD INDUSTRIES

ROAD MACHINERY DIVISION
WAYNE, MICHIGAN

A development of
B.F.Goodrich
FIRST IN RUBBER



Users report: B.F.Goodrich Universals wear longer, resist bruising, side slippage

EVERY operator knows the formidable array of tire problems involved in working trucks over rough terrain — in quarries, strip mines, or on general contracting. The problem of *traction,* for example, where wheels spin, cutting tread or sidewall — or bog down in mud! And *impact,* when tires under load strike boulders, ruts, or stumps . . . resulting in bruises, ply separation, and blow-outs.

The B.F.Goodrich Universal, shown above, is a special tire with features *specifically designed* to take the abuses of operations in the rough. B.F.Goodrich engineers developed the tread with thick, heavy lugs. And the tread is designed to clean itself; natural running action pushes mud and dirt toward the edges. Traction is improved. Too, the tread design provides identical traction for either direction —*and* resists side-slipping.

In addition, B.F.Goodrich engineers developed an entirely new construction principle, the *shock shield.* It's a set of four breakers — layers of rubber-coated nylon cords — built in between the tread and the plies. These breakers are in pairs, with the cords in each pair running parallel to each other — but with each pair running in opposite directions to give balanced strength.

Under impact, breaker cords stretch together, *not* across each other, and return to their original position. The blow is *distributed* and *absorbed* by the rubber cushions; shock is greatly reduced.

Therefore it is not surprising when users of Universals and other B.F.Goodrich tires designed to meet special needs, report longer wear, greater all-round *savings.* Find out, now, how B.F.Goodrich off-the-road tires will save *you* money. See your B.F.Goodrich dealer or write us direct. *The B.F.Goodrich Company, Akron, Ohio.*

Truck Tires BY

B.F. Goodrich

THIS PILE-DRIVING JOB DID NOT HALT PIER OPERATIONS

A San Diego, Calif., pier had to be completely rebuilt and enlarged without interrupting busy oil and lumber operations. The contractors, Case Construction Company, used this simple plan successfully. They finished one-half the pier width at a time, leaving one-half always in service.

A McKiernan-Terry Double-Acting Pile Hammer drove new piling through holes cut in the old decking. The decking was then removed and the old piling pulled. Laying the new deck completed the operation.

No pile-driving job is too unusual or too difficult for McKiernan-Terry Hammers. For over fifty years their power, speed, safety and dependability have been demonstrated on construction projects of every size and type. Now available in a standardized line of ten double-acting pile hammers, five single-acting hammers and two double-acting extractors.

FREE DESCRIPTIVE BULLETINS

Write for copies of Bulletins No. 55 and No. 57, giving complete information, specifications, advantages, illustrations.

McKIERNAN-TERRY BLACKER HAMMER

This "blacksmith's mechanical helper" is an electric-motor-driven power hammer that replaces hand sledges, enabling one smith to handle any hand-forging operation without human helpers. Write for Blacker Hammer Bulletin No. 56.

McKiernan-Terry CORPORATION

Manufacturing Engineers

14 PARK ROW **NEW YORK 7, N. Y.**

MK-126

McKiernan-Terry Pile Hammer driving new piles through holes in the old decking.

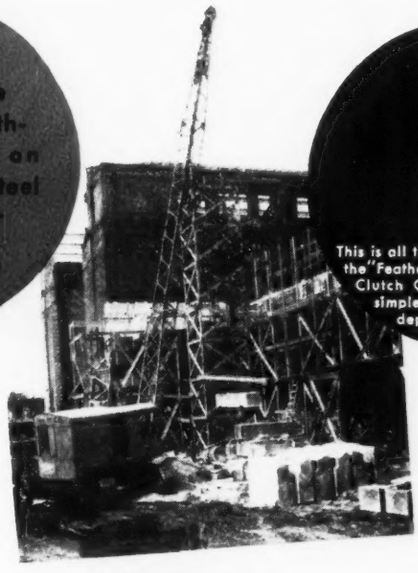
One-half the width of the pier available for use during rebuilding of the opposite half.

Shovel and Crane Operation

THE SIMPLE WAY!

Smooth, easy operation, hour after hour, means a full dragline bucket like this and a high daily output.

Here's where the feel of the load counts. Northwest operation on setting stone or steel means greater accuracy and safety.



This is all there is to the "Feather-Touch" Clutch Control—simple, positive, dependable.

The easy operation of the "Feather-Touch" Clutch Control goes far to make the Northwest Shovel a real Rock Shovel and assures high output in tough rock digging.

THE EASY WAY!

with the Northwest "Feather-Touch" Clutch Control

EASE of operation is one of the secrets of high output! Northwest solved the problem of easy operation a long time ago.

On a Northwest the *power of the engine* shifts heavy drum clutches through a *simple mechanicl device* —the "Feather-Touch" Clutch Control. Clutch action is in direct relation to the movement of the operating lever, release is positive and *there can be no shutdown of your equipment because of control failure.*

The "Feather-Touch" Clutch Control is not affected by weather. There are no high pressure lines, no pumps, nothing to refill and it is not affected by temperature—it's simple, positive, dependable! It has been proved in years of all types of service and it assures easy operation that keeps the output up at the end of the day.

Follow the Northwest Crowd and plan ahead to have Northwest equipment.

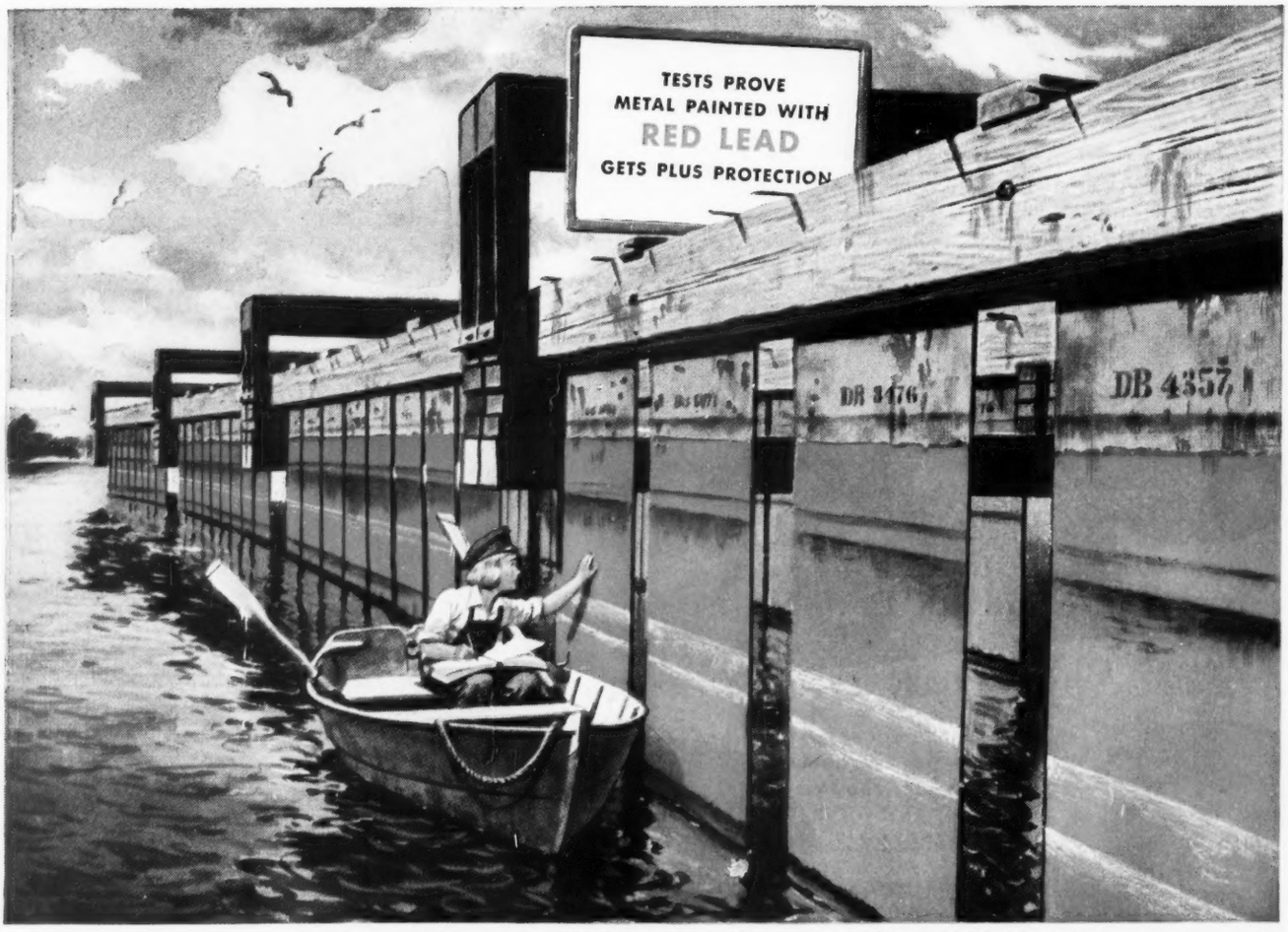
NORTHWEST ENGINEERING COMPANY
1728 Steger Bldg., 28 E. Jackson Blvd.
Chicago 4, Illinois

follow the Northwest crowd!

If you have a REAL ROCK SHOVEL you never have to worry about output in dirt!

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS



Thousands of tests, under all kinds of service conditions, prove that "Dutch Boy" Red Lead gives metal extra protection

4 Ways RED LEAD RESISTS EFFECTS OF WATER ...guards against Rust

Maintenance engineers have long recognized Red Lead as the "standard" metal protective paint. This acceptance is based, to a great extent, on its marked ability to stand up against moisture, a powerful factor in the rusting process.

Now, scientific research into the inherent properties of the pigment itself, shows just how and why Red Lead resists the effects of water. Briefly, there are four reasons:

1. Red Lead resists water "pick-up"—If a series of various metal protective paint films are weighed and then submerged in water (salt or fresh), it is readily noticed, on reweighing after several days immersion, that Red Lead films have outstanding resistance to the absorption, or "pick-up," of water.

2. Red Lead resists passage of moisture—Rusting of metal will not take place if water does not penetrate the paint film to reach the metal.

***Testing Water Permeability of Paint Films**—With this standard apparatus a measure of the amount of water that passes through a unit of film is obtained.*

Experiments show that a straight linseed oil film allows three times as much water to pass through the film as when the same film is pigmented with Red Lead.

Water permeability tests of paint films (see illustration at lower left) show, beyond question, that Red Lead is one of the most effective metal protective pigments, because of its stubborn resistance to the passage of moisture through the film.

3. Red Lead resists solution by water—The action of water on paint films results in a partial dissolving of the film. Many metal protective films lose a considerable percentage by weight of their films through solution in water. On the other hand, the solubility losses of Red Lead paint films are practically negligible.

4. Red Lead resists distortion by water—Red Lead films have little tendency to shrivel or change in size during immersion in water. This is imperative to good metal protection. For good protection depends on good adhesion, and a paint film maintains better adhesion when it is not distorted by the action of the water.

* * *

Remember, too, Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including all fast-drying resins.

Specify RED LEAD for ALL Metal Protective Paints

The value of Red Lead as a rust preventive is most fully realized in a paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint. No matter what price you pay, you'll get a better paint for surface protection of metal if it contains Red Lead.

WRITE FOR BOOKLET—"*Red Lead in Corrosion Resistant Paints.*" This authoritative guide is available to those responsible for specifying and formulating paints for structural iron and steel. It describes in detail the scientific reasons for Red Lead's superior protection. It also includes typical specification formulas. If you haven't received your copy, address nearest branch listed below.

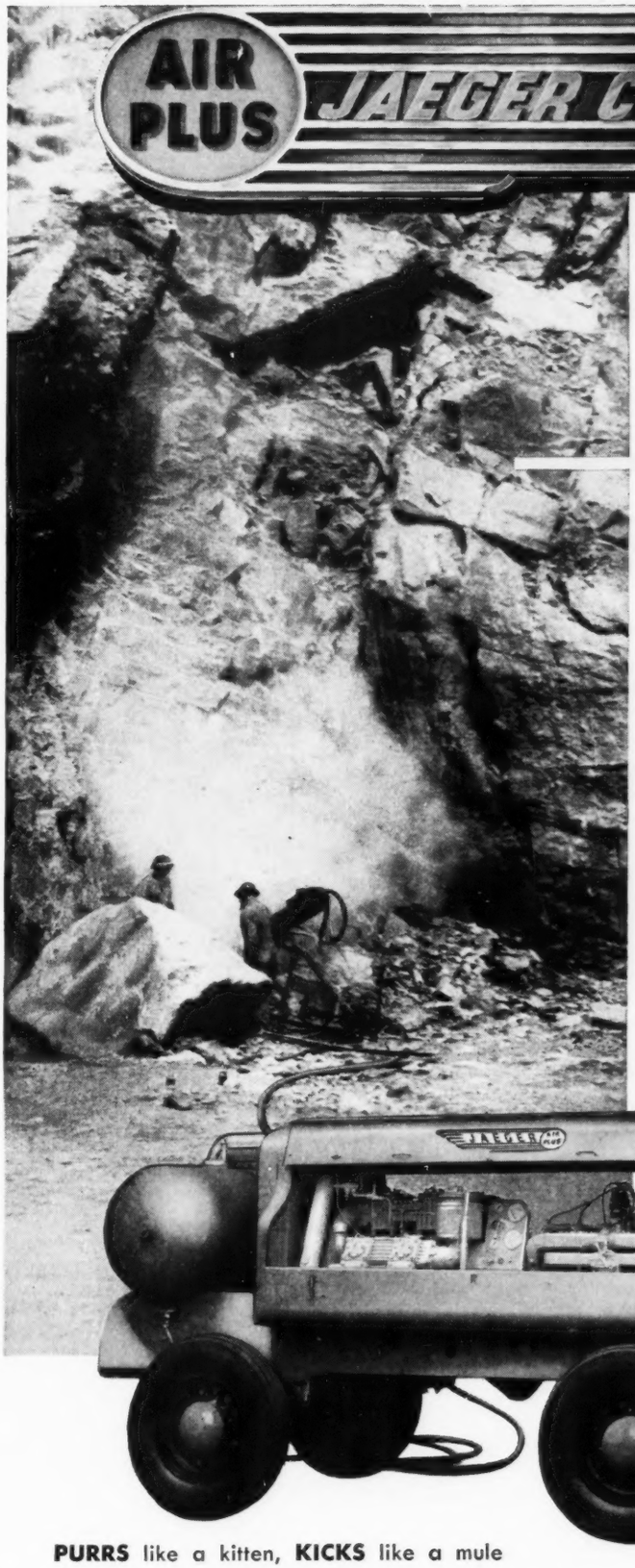
* * *

The benefit of our extensive experience with metal protective paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6; Buffalo 3; Chicago 8; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 10; Boston 6, (National Lead Co. of Mass.); Philadelphia 7, (John T. Lewis & Bros. Co.); Pittsburgh 30, (National Lead Co. of Pa.); Charleston 25, W. Va., (Evans Lead Division).

DUTCH BOY
Reg. U. S. Pat. Off.
RED LEAD

AIR PLUS JAEGER COMPRESSOR



picked for the **tough** *air jobs*

Have you noticed the high number of "AIR PLUS" Compressors on the jobs where you meet rough going and there's constant heavy need for air?

Contractors know that Jaeger builds for that kind of service — with 75% to 100% bigger, cooler valves that operate indefinitely without carbon, with 20% to 30% slower, long-life piston speeds (800 f.p.m.), with full force feed lubrication, lifetime clutches, and interchangeable precision parts. They know that Jaeger standardizes on dependable Caterpillar and International diesels and Continental gasoline power. They know that engine and compressor will safely trail wherever a truck can travel, protected by the most rigid frame and roadable mounting ever put beneath a portable compressor.

THE JAEGER MACHINE COMPANY
Main Office and Factory: Columbus 16, Ohio
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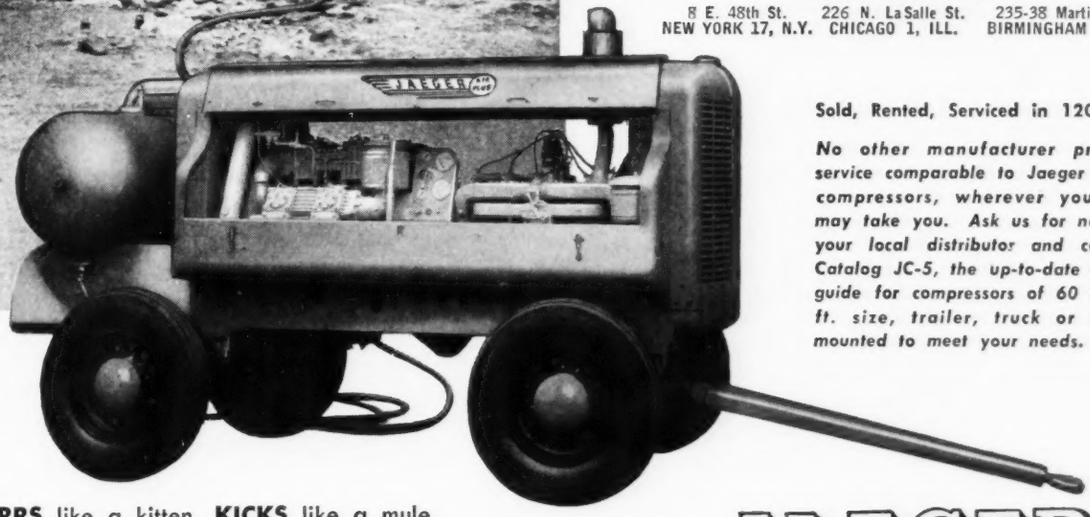
8 E. 48th St. NEW YORK 17, N.Y. — 226 N. LaSalle St. CHICAGO 1, ILL. — 235-38 Martin Bldg. BIRMINGHAM 1, ALA.



Sold, Rented, Serviced in 120 Cities

No other manufacturer provides service comparable to Jaeger on air compressors, wherever your jobs may take you. Ask us for name of your local distributor and copy of Catalog JC-5, the up-to-date buyer's guide for compressors of 60 to 500 ft. size, trailer, truck or tractor mounted to meet your needs.

PURRS like a kitten, **KICKS** like a mule

"FLEET-FOOT" Loaders

"SPEEDLINE" Concrete Mixers

"SURE PRIME" Contractors Pumps

JAEGER *Engineered* **EQUIPMENT**

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TEXACO STAR THEATRE
presents the NEW
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every Sunday night.
Metropolitan Opera broadcasts Saturday afternoons.

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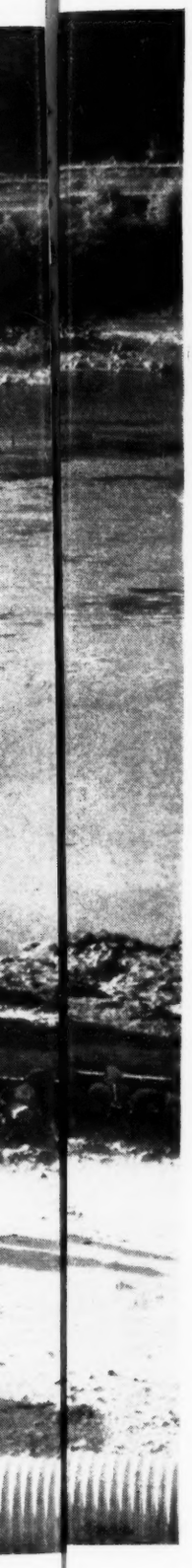

Give HEAVY-DUTY ENGINES HEAVY-DUTY PROTECTION

YOU need an oil with special characteristics to keep your heavy-duty Diesels and gasoline engines running efficiently. *Texaco Ursa Oil X*** is made for this job. It's both detergent and dispersive and resists oxidation. It keeps engines clean . . . prevents power-stealing sludge, varnish, carbon, etc.

*Texaco Ursa Oil X*** assures snappy valve action, keeps rings free for proper compression and combustion. It reduces engine wear to virtually nothing and protects bearings against corrosion. You'll get peak efficiency and power . . . use less fuel and spend less for servicing and maintenance.

Texaco offers contractors a complete line of effective lubricants and fuels to improve the efficiency of all construction equipment. For full details about these and the Texaco Simplified Lubrication Plan, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LONGER LIFE FOR CONSTRUCTION EQUIPMENT

Lubricate tractors, graders, shovels and other equipment with *Texaco Marfak*. They'll last longer, and you'll spend less on them for maintenance.

Long-lasting *Marfak* stays on the job — won't squeeze out under heavy loads, won't jar out in rough service. It seals out dirt and moisture, protects parts better with fewer applications.

More than 250 million pounds of Marfak have been used to date!

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Jobs prove TOURNAPULL...

Beats bad weather

Moving 430,000 yards up 8 to 12% grades to stabilize bank of Chesapeake & Delaware Canal through 6 months of winter cold and spring rains was toughest job for Hendrickson Bros., Inc., in 20 years of dirtmoving. Job conditions — soft caving bank of saturated sand, clay and silt pocketed in unpredictable formations, slippery to load, hub-deep on the haul, mush on the fill. Weather — wet, cold and raw . . . freeze and thaw . . . rain and freeze. Never enough sunshine to dry more than a thin skin over the water-soaked muck. Hendrickson Bros., Inc., licked it with the help of 5 Tournapulls that moved 60% of total yardage . . . stayed on-the-job from start to finish.

Fast on short or long hauls

On New York State Hwy. 16, Triple Cities Construction Corp. used 3 Tournapulls on hauls from 120 to 800' one-way. Working cuts at each end of fill, with 120' haul on one end and 200' on the other, each Tournapull delivered 15 loads an hour. Much of the material was blue gumbo, wet clay and quicksand. On 800' haul the 3 rigs averaged 2500 yards every 8 hours. Production like this on short hauls proves Tournapull's ability to deliver lowest-net-cost-per-yard on ANY length of haul.

Moves tough material

On Connecticut's Wilbur Cross Turnpike, N. D. Maselli Corp. had 360,000 tough yards of stoney gravel, sand, hardpan and decomposed shale, moved 90% with 7 Tournapulls. Helped by LeTourneau Rooter that broke hardest material, Tournapulls put job 33 days ahead of schedule in first 52 days . . . lost only 1½ hours downtime per Tournapull in the 52 days of hard, fast dirt-moving. On 2-mile cycle, each Tournapull averaged 60 yards per hour. "Wouldn't believe our Tournapull records if hadn't been on job myself", said Gus Bonola, superintendent for Maselli.

. . . the basic tool for dirtmoving

Works steep grades

On 170,000-yard overpass job at Ogden, Utah, Gibbons and Reed Construction Co., of Salt Lake City, moved total yardage with their Tournapull fleet over grades that were really tough. Typical cross section on 2440′ cycle showed: Return — 210′ adverse 11%, 230′ adverse 16%, 160′ adverse 11%, 400′ adverse 6%: Haul — 140′ favorable 10%, 160′ favorable 40 to 50%, 150′ favorable 8%, balance negligible; Production — 264 yards of sand per hour for 3 Tournapulls despite traffic hold-ups on hauls across Union Pacific tracks. Rigs drove into job from Las Vegas, Nevada . . . 550 miles in 2½ days.

Versatile for all types of jobs

Rhoten & Frysinger Const. Co. used 2 Tournapulls grading 60,000 yards of clay for racetrack north of Columbus, Ohio. On 400 to 800′ hauls, each averaged 1079 yards per 8-hour day. When 23 days rain shut down job because fill could not go in wet, Rhoten & Frysinger drove Tournapulls 12 miles to Marble Cliff Quarries for stripping, on 2,000′ hauls; each rig did 616 yards per 8-hour day . . . kept right on working and earning. On the two jobs, the 2 rigs moved total of 80,000 yards in 50 days. Later, a third Tournapull was added and all 3 rigs now work full time at quarry (see photo).

Jobs like these prove the high-speed, rubber-tired Tournapull is the basic tool for dirtmoving . . . will handle the major percentage of your yardage at lowest-net-cost-per-yard. Ask your LeTourneau Distributor for more complete information on what Tournapulls will do for you.

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LETOURNEAU PEORIA, ILLINOIS — JOB-PROVED Over 4700 Built and Shipped — **TOURNAPULLS**

Trade Mark Reg. U. S. Pat. Off. C52

FOR LOWEST NET COST PER YARD

70 MILLION YARDS OF ENGINEERING EXPERIENCE

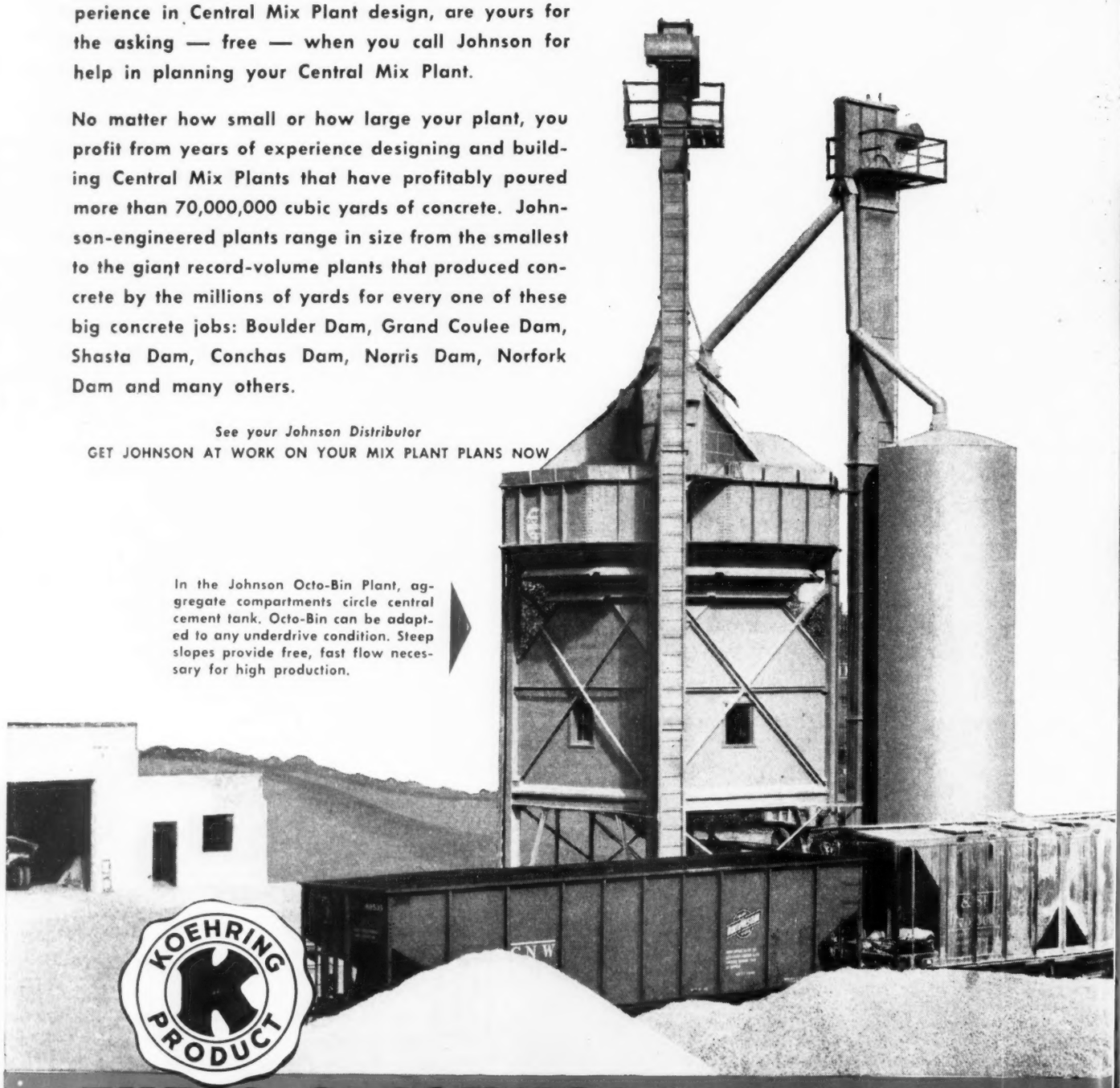
INSURE JOHNSON PROFITS TO YOU...

Tested ideas, developed by the engineering organization possessing the world's widest range of experience in Central Mix Plant design, are yours for the asking — free — when you call Johnson for help in planning your Central Mix Plant.

No matter how small or how large your plant, you profit from years of experience designing and building Central Mix Plants that have profitably poured more than 70,000,000 cubic yards of concrete. Johnson-engineered plants range in size from the smallest to the giant record-volume plants that produced concrete by the millions of yards for every one of these big concrete jobs: Boulder Dam, Grand Coulee Dam, Shasta Dam, Conchas Dam, Norris Dam, Norfork Dam and many others.

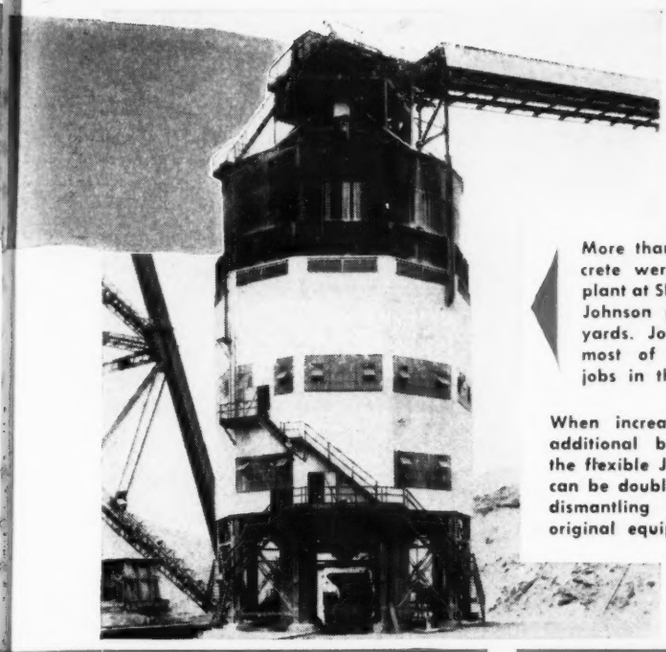
See your Johnson Distributor
GET JOHNSON AT WORK ON YOUR MIX PLANT PLANS NOW

In the Johnson Octo-Bin Plant, aggregate compartments circle central cement tank. Octo-Bin can be adapted to any underdrive condition. Steep slopes provide free, fast flow necessary for high production.



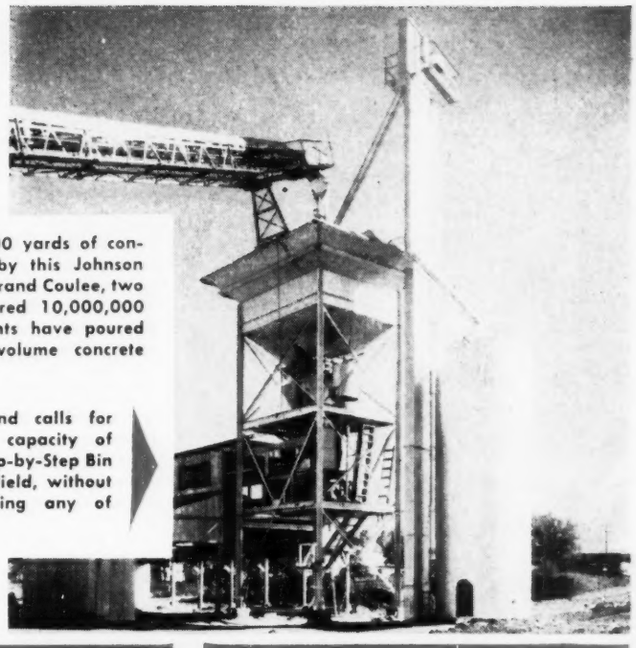
KOEHRING PRODUCT

THE C. S. JOHNSON COMPANY
KOEHRING SUBSIDIARY . . . CHAMPAIGN, ILLINOIS

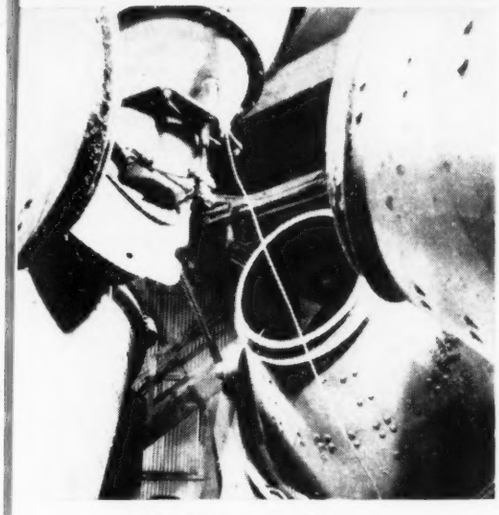


More than 5,000,000 yards of concrete were poured by this Johnson plant at Shasta. At Grand Coulee, two Johnson plants poured 10,000,000 yards. Johnson plants have poured most of the big volume concrete jobs in the U. S.

When increased demand calls for additional bin space, capacity of the flexible Johnson Step-by-Step Bin can be doubled in the field, without dismantling or sacrificing any of original equipment.



KOEHRING CONSTRUCTION MIXERS



20,000 yards in one 24-hour period

Eight 4-yard Koehring Concentric Zone mixers in the Johnson Central Mix Plant at Grand Coulee poured a record 20,000 cubic yards of concrete in one 24-hour nonstop period, after pouring 5,000,000 cubic yards prior to the record run. From midnight to midnight, these mixers never stopped once.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

KWIK-MIX 16-S DANDIE CONCRETE MIXER

Every batch a perfect mix

Improved mixing action of the revolving drum of the Kwik-Mix 16-S Dandie mixes every batch of concrete for perfect texture. You get better concrete because every particle of the aggregate is completely cement-coated. Same thorough mix in all Kwik-Mix Dandie mixers including 3½-S, 6-S and 11-S sizes.

KWIK-MIX COMPANY
PORT WASHINGTON, WISCONSIN

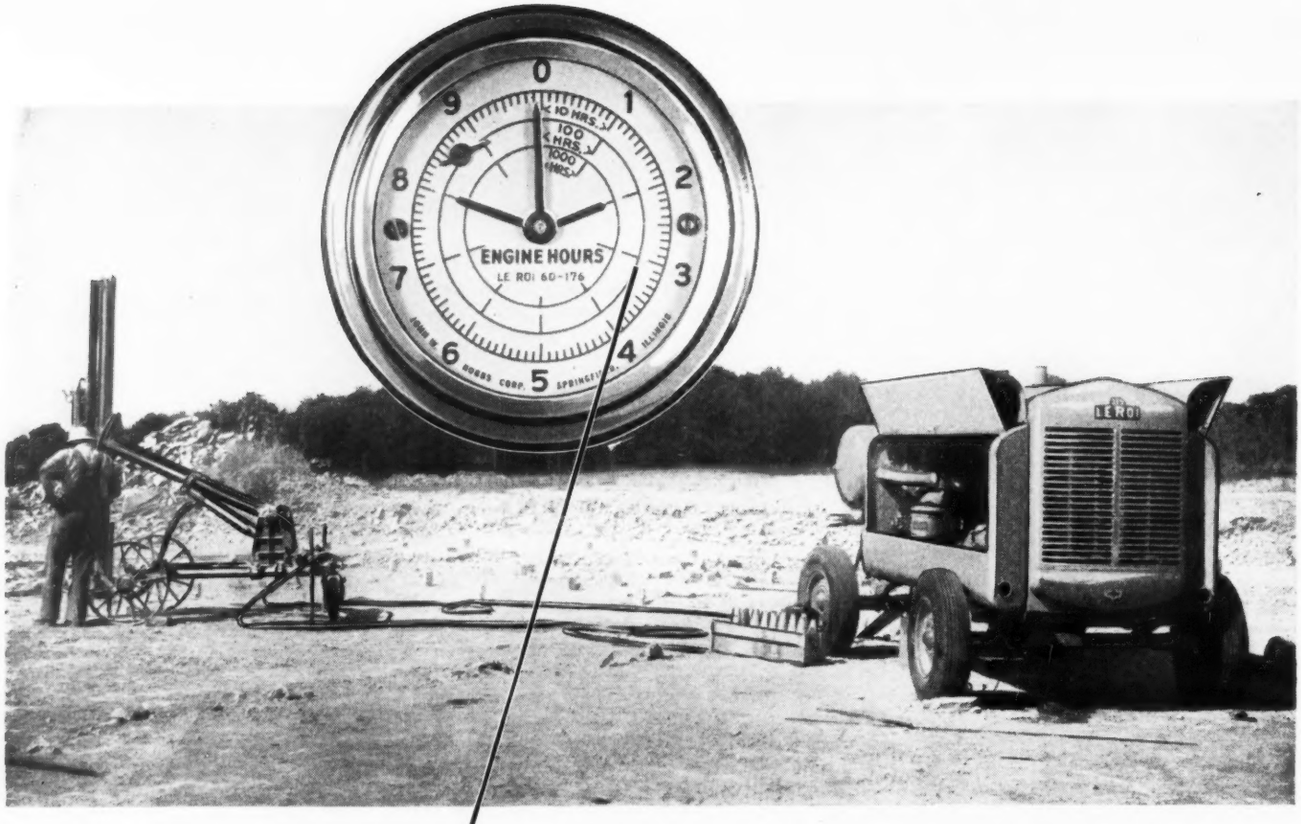
PARSONS 221 TRENCHLINER*

Sidesteps side obstructions

Boom of the Parsons 221 Trenchliner quickly and easily rides on rollers from side to side across the full width of the Trenchliner. That's why the Parsons 221 Trenchliner can cut a trench as close as 10" from side obstructions. Trenches up to 8' depth, 16" to 36" wide.

*Reg. Trade-mark

PARSONS COMPANY
NEWTON, IOWA



be a clock watcher

. . . see why LE ROI AIRMASTERS save time and money

We are proud of AIRMASTER performance. We know what these compressors can do. We want you to know, too. That is why every AIRMASTER has an accurate electric hour-meter.

With this clock, you can easily check the hours of operation against fuel consumption and maintenance costs. You can quickly see the "money-in-your-pocket" benefits produced by the following features that have been so expertly teamed together by Le Roi engineers:

The fuel-saving regulation of the Econotrol.
The efficiency of the cushioned, magnafluxed AIRMASTER valves.
The dry, oil-free air from the new AIRMASTER intercooler.
The life-prolonging, positive lubrication system.
Unit construction — and many other refinements.

Besides showing that AIRMASTERS turn out air at lower cost, the clock keeps track of compressor operating time. This proves dependability, for you find that AIRMASTERS run longer with less trouble.

AIRMASTERS are available in all styles of mountings, and with gasoline or diesel power. Sizes range from 60 to 500 cfm. See your Le Roi distributor for all the facts or write for bulletins. Remember — AIRMASTER* stands for Portable Air Power at is Best.

*Reg. U. S. Pat. Off.

Le Roi
Heavy-duty engine

Le Roi
*105 Tractair**

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Engine-generator set

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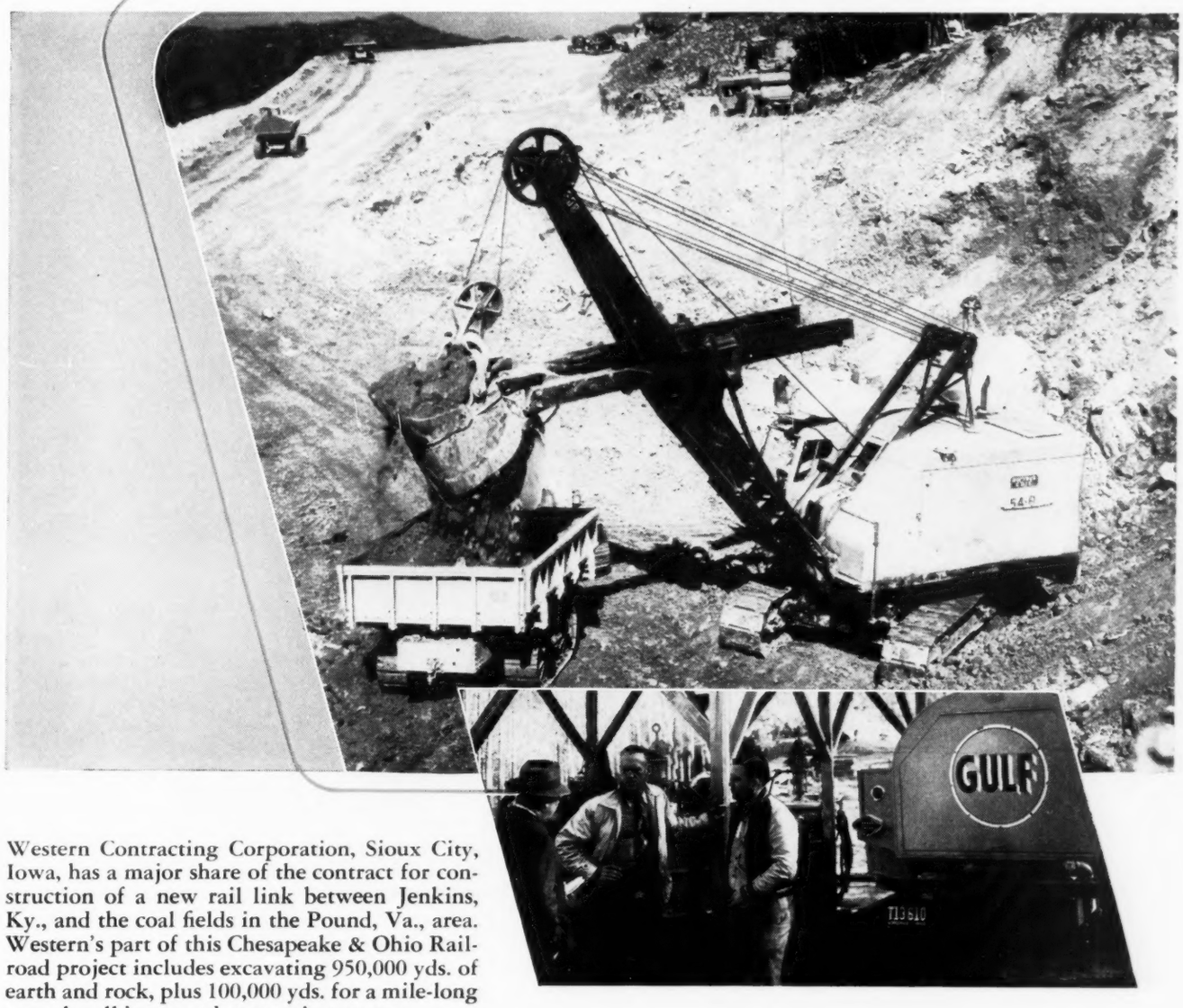
C-109

Big tunnel job goes rapidly . . . with the help of Gulf Products and prompt delivery service



Western Contracting Corporation, Sioux City, Iowa, has a major share of the contract for construction of a new rail link between Jenkins, Ky., and the coal fields in the Pound, Va., area. Western's part of this Chesapeake & Ohio Railroad project includes excavating 950,000 yds. of earth and rock, plus 100,000 yds. for a mile-long tunnel—all in rugged mountain country.

"THERE are enough headaches on a tough job of this kind without taking chances on lubrication and fuel performance," says Harry Schutt, Equipment Superintendent of Western Contracting Corporation. "That's why we specified Gulf lubricants and fuels—we know their uniform high quality, which shows up in smoother operation of our equipment, fewer mechanical delays, and lower maintenance costs."

On all types of construction projects, Gulf quality petroleum products play an important part in keeping the job rolling smoothly. Gulf lubricants provide a higher degree of protection —and Gulf fuels help contractors get an extra margin of performance from their mechanized equipment. Result: speedier, more profitable jobs!

Write, wire, or phone your nearest Gulf office and arrange to use Gulf higher quality lubricants and fuels on your next contract. They are quickly available to you through 1200 warehouses located in 30 states from Maine to New Mexico.

GULF

Gulf Oil Corporation
Gulf Refining Company

Division Sales Offices:
Boston · New York · Philadelphia · Pittsburgh
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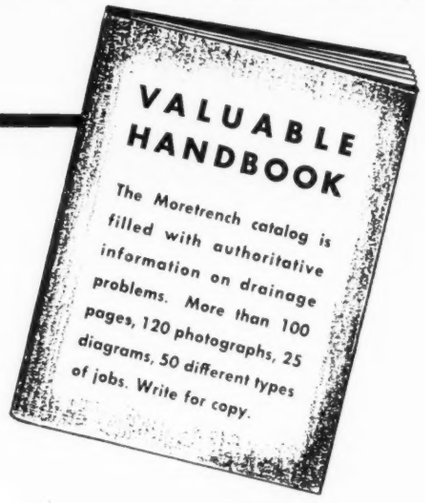
Power Plant Addition — Tulsa, Oklahoma

This was a job to be handled with kid gloves—a deep foundation with plenty of water—right next door to a power plant!

The contractor chose the safest, most economical method known to predrain the excavation—the MORETRENCH WELLPOINT SYSTEM. With the water under control, he was free to construct—in the dry.

Progress on your wet work can be just as sure. A Moretrench Wellpoint System is your guarantee. Our engineering facilities are at your service to plan, estimate, and direct dewatering of your project.


VALUABLE HANDBOOK
The Moretrench catalog is filled with authoritative information on drainage problems. More than 100 pages, 120 photographs, 25 diagrams, 50 different types of jobs. Write for copy.

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NOVO NEWS

JANUARY, 1947

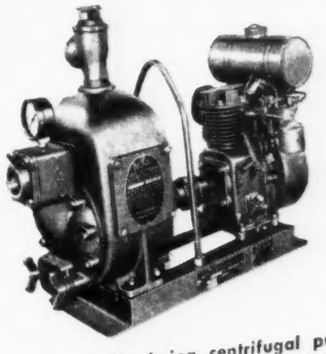
"Pronto-Prime" Survives Cave-ins, Runs 1,008 Consecutive Hours!

Dug Out, It's Ready to Run After a Bath

The scene is Bremen, Indiana. Construction workers under Arthur M. Keyser, Superintendent of Light and Water, are struggling against odds to lay a sewer line in wet, sandy soil three feet below the water table. The ditch resembles a small river despite all efforts to keep it dry. Pump after pump fails. The sandy water and eleven to seventeen-foot lift are too much. Finally, Mr. Keyser adds a Novo "Pronto-Prime" pump.

In true Hollywood style, cave-ins bury the "Pronto-Prime." Fearfully, workers dig it out time after time—remove the cleanout plate—dash in some water—bake the magneto dry—reinstall it—start the engine. Instantly, as if being buried alive were nothing, "Pronto-Prime" is at work again . . . runs steadily for 1,008 hours!

This picture shows what the "Pronto-Prime" was up against twenty-four hours a day for six weeks. Working three feet below the water table, it had to lift sandy water from eleven to seventeen feet through fifty feet of hose over a twenty-five-foot embankment—a really tough job.



A Novo self-priming centrifugal pump from the Deeds Equipment Co. helped to lick the terrific dewatering problem of Bremen, Ind., because of its many features—long-lived, rotating Neoprene seal which is self-aligning, self-adjusting, oil-lubricated; super-speed priming; self-cleaning; independent pump unit; accessibility of all wearing parts; and many other advantages.

Supt. Pays Tribute To "Pronto-Prime"

"The Novo pump," said Supt. Keyser, "seemed to be able to take the sand much better than the other pumps. After finishing the sewer, we needed a pump on a well to furnish water for a foundation. The Novo did the job, pulling twenty-two inches of vacuum at all times. I think it exceptional that, after all the punishment it took on the sewer job, it pumped at all without replacing any glands."

NOVO
ENGINE COMPANY
LANSING 5, MICH. U.S.A.
CONTRACTOR'S EQUIPMENT
· GRAY IRON CASTINGS ·
ENGINES

Allied Member of A. E. D.

—with a fleet of Wooldridge Terra-Cobras

WOOLDRIDGE "TERRA-CLIPPER" Scrapers embody the same Bowl features as the "Terra-Cobra"

Lifting thousands of yards of sandy soil from the toe to the crest of this earth-fill dam at Fort Peck, Montana, is another job calling for the high speed, high production performance of Wooldridge Terra-Cobras. Positive traction, power, speed and two-wheel steering control result in fast loading, haul, spreading and return travel. Full capacity yardages moved per unit insure uniformly high averages throughout each shift. Extreme ease of handling the Terra-Cobra—fully loaded or empty—over all types of ground surfaces—permits operator to avoid fatigue slow-downs. To speed-up earth-work schedules, investigate Wooldridge Terra-Cobras—today. Write for full details.

Measure Each Job in terms of WOOLDRIDGE EQUIPMENT:

- High Speed EARTHMOVERS
- Tractor-drawn SCRAPERS
- BULLDOZERS
- TRAILBUILDERS
- RIPPERS
- POWER CONTROLS

WOOLDRIDGE MANUFACTURING CO.
SUNNYVALE, CALIFORNIA
NATIONWIDE SERVICE

WOOLDRIDGE

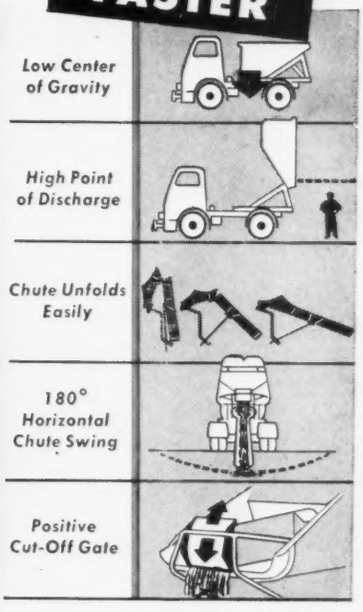
TERRA COBRA

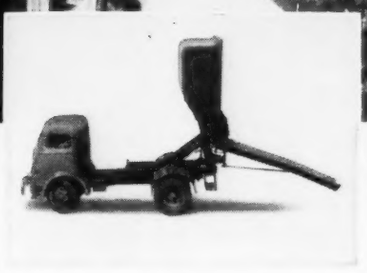
HIGH SPEED-SELF PROPELLED

EARTHMOVERS

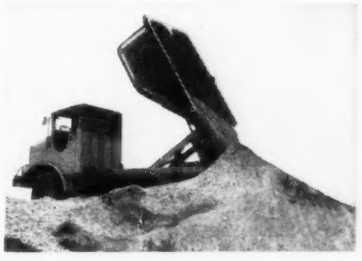
NEW SPECIAL DUMP BODY HAULS CONCRETE

EASIER CHEAPER FASTER





Full vertical dumping angle for clean discharge.



Body design and high point of discharge are ideal for hauling and stock piling sand, gravel, earth and coal.

A new combination—Air-Entrained Concrete and the DUMPCRETE—is increasing production and cutting costs for concrete producers all over the U. S.

With air-entrainment, the tested and proved method of bettering concrete, you haul *precision-mixed* concrete from central plant up to 45 minutes (and more) without agitation . . . yet neither segregation nor bleeding is a problem.

Thus you can now have *fast delivery* at *low cost* with the Dumpcrete—specially designed to carry concrete without agitation.

The new, economical Dumpcrete loads easily, speeds through traffic and dumps quickly.

So much time is saved that the Kolinski Concrete Company, Milwaukee, reports, "We deliver about one load a day more concrete in our Dumpcretes than in our mixer trucks" . . . Jim Nicholson of Toledo says, "Ten to twenty percent more production than with truck mixers."

These progressive concrete men produce more . . . at lower cost, because the Dumpcrete costs *less to buy, costs less to operate, and costs less to maintain.*

If you want to be able to meet the competition of the future with quick, low-cost concrete delivery, send for complete information. Tear out the coupon now, before you forget.

• • •

The Dumpcrete was developed, tested and proved by a construction organization whose experience includes handling millions of yards of concrete on dams, locks, bridges and industrial projects with every known type of concrete transporting equipment.

Here are the FACTS About the DUMPCRETE

The Dumpcrete was designed especially for hauling air-entrained concrete. It is available in 2-yard and 4-yard sizes, either of which will mount on your standard truck chassis. Dumpcrete has a *low center of gravity*, but *high discharge point* (over 6 feet for 4-yard, almost 5 feet for 2-yard). 90-degree dumping angle and rounded interior corners provide clean discharge. Flow of concrete controlled by adjustable baffle, deflector plates, inverted keel and positive cut-off gate. Five-foot chute unfolds in a few seconds. Extra five-and-one-half foot section furnished. Chute has *180 degree horizontal swing* and full vertical adjustment. Gate and hydraulic lift controls located conveniently at rear of body. Weight of 2-yard body, 2100 pounds; 4-yard, 4200 pounds complete. Will deposit into buckets, hoppers, forms and onto slabs. *Original cost, maintenance and operating expenses* are low. Cuts costs further by reducing loading, transit and discharge time. Entire gate and chute assembly removable for hauling sand, gravel, earth and coal. Already in use in 18 states. *Early delivery.*

DUMPCRETE

DIVISION OF
MAXON CONSTRUCTION COMPANY
403 TALBOTT BUILDING • DAYTON 2 • OHIO

Send me facts on how the Dumpcrete is now being used successfully.

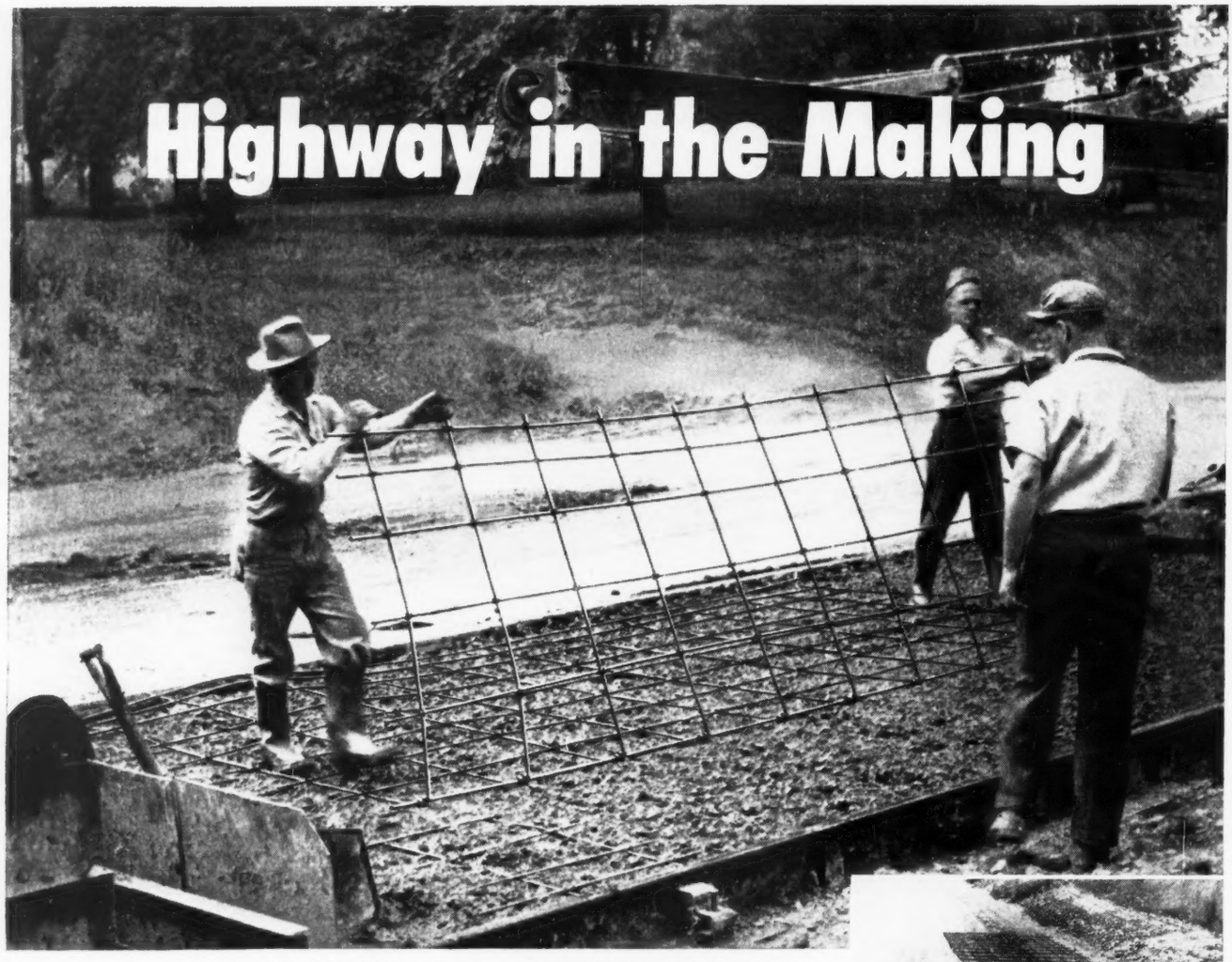
Name_____

Firm_____

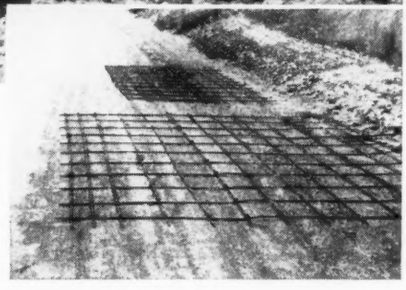
Street_____

City_____ State_____

Highway in the Making



Because Bethlehem hinged bar mats can be folded to about half of the standard mat size, they can be handled by two men, and easily trucked without exceeding the road-width limit set up by state highway departments.



These on-the-job photographs were taken near Avon, N. Y., during construction of a six-mile, two-lane stretch of Route 5—through highway from Albany westward to Buffalo. Built for New York State Division of Highways by the Potter-DeWitt Co. of Pavilion, N. Y., this new section required 62,000 sq yd of concrete. Bar mats and other steels for the job were furnished by Bethlehem.

Many contractors regularly turn to Bethlehem whenever they need steel to build a highway or highway bridge. Bethlehem steel service saves time and money. You can obtain from this one source practically every type of steel needed to build a modern highway or bridge. And Bethlehem handles your order as a unit, with individual items scheduled to reach the job when needed. You avoid a lot of needless follow-ups, and minimize bookkeeping.

Next time you have a contract for a highway- or bridge-building job, regardless of size, put your steel requirements up to Bethlehem.

LEADING BETHLEHEM HIGHWAY PRODUCTS

Road Joints — Reinforcing Bars
Bar Mats — Guard Rail
Guard Rail Posts and Brackets
Wire Rope and Strand — Hollow Drill Steel
Fabricated Structural Steel
Sheet and H-Piling — Spikes
Timber Bridge Hardware
Bolts and Nuts — Tie-Rods

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

STEEL for HIGHWAYS

BETHLEHEM STEEL

RUBBER-TIRE EXCAVATORS

HAVE A PLACE ON YOUR JOB...

MOTO-HOE

MOTO-DRAG

MOTO-SHOVEL

MOTO-CLAM

• Why not rubber-tire excavators? Many hundreds of Moto-Cranes are travelling testimonials for the time and money-saving advantages of rubber-tire mountings in crane service.

A shovel, clamshell, dragline or hoe on a rubber-tire mounting can roll up extra profits for you, too. It will travel the concrete or a cowpath—and be on the job working while less mobile units are just packing their grip. It's built to keep busy—moves miles between jobs in minutes—shuttles about the work site doing dozens of jobs you could not afford to assign to other type machines.

Every Moto-Excavator is a potential shovel, clamshell, dragline or hoe through the use of interchangeable boom equipment. Mountings are available in 4 or 6 wheel types with or without front wheel drive.

Add "jet propulsion" to your excavating service in 1947! Travel on rubber tires—dig on rubber tires with a Moto-Shovel, Moto-Clam, Moto-Drag or Moto-Hoe. It's practical, and plenty profitable. For complete information, see your local Thew-Lorain distributor.

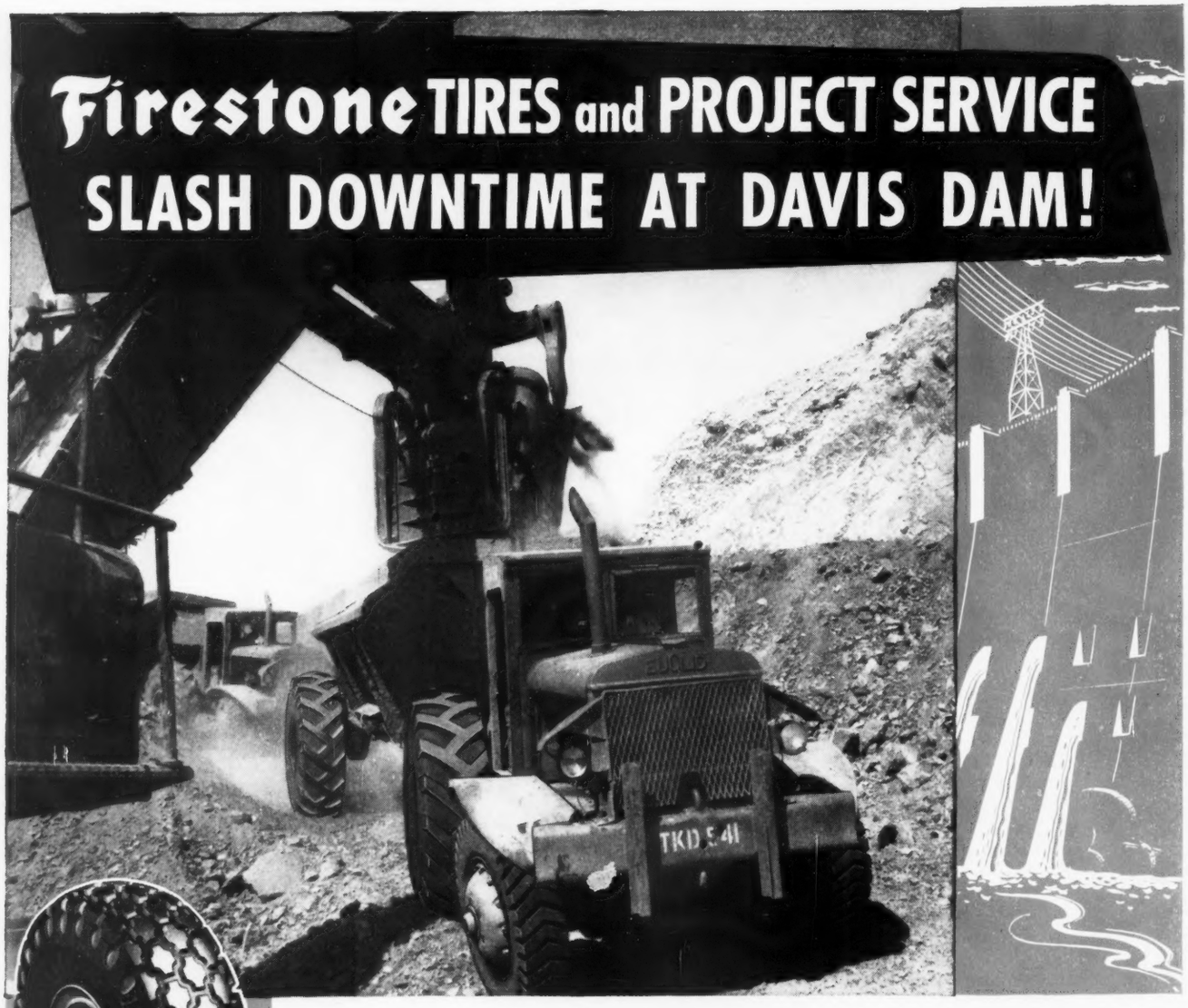
Reg. Trade Mark

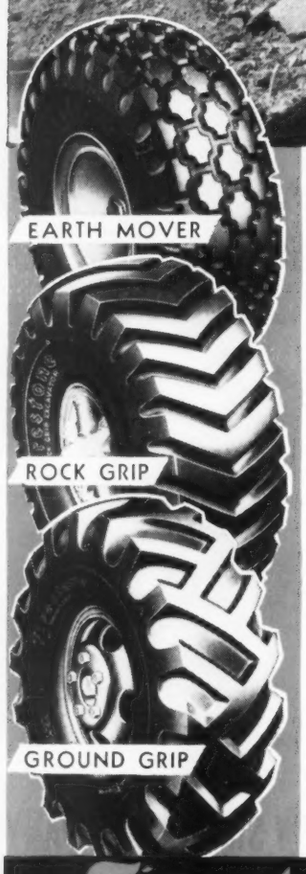
thew-Lorain

THE
THEW SHOVEL COMPANY
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

Firestone TIRES and PROJECT SERVICE SLASH DOWNTIME AT DAVIS DAM!





AT THE Davis damsite, Firestone Off-the-Highway tires and project service are writing a great new chapter in earth-moving history. Downtime, due to tire failure, has been virtually eliminated!

Utah Construction Company, operating company in the building of this huge earth and rockfill dam, has turned over to Firestone Dealer, Bailey, Inc., sole responsibility for the supplying and maintenance of all tires on the project. This equipment operates 24 hours a day over some of the roughest and hottest terrain in the country. Records show that downtime on dump trucks, scrapers, road patrols, tractors, trucks and trailers has been slashed to the vanishing point.

These same Firestone Off-the-Highway tires, and technical knowledge and project service are available to you in every part of the country. For complete information consult your nearest Firestone Dealer or Firestone Store.

Copyright, 1947, The Firestone Tire & Rubber Co.

Firestone OFF-THE-HIGHWAY TIRES

IT'S DIFFERENT!
IT'S DURABLE!
IT'S EFFICIENT!
IT'S LIGHT!
IT'S NEW!

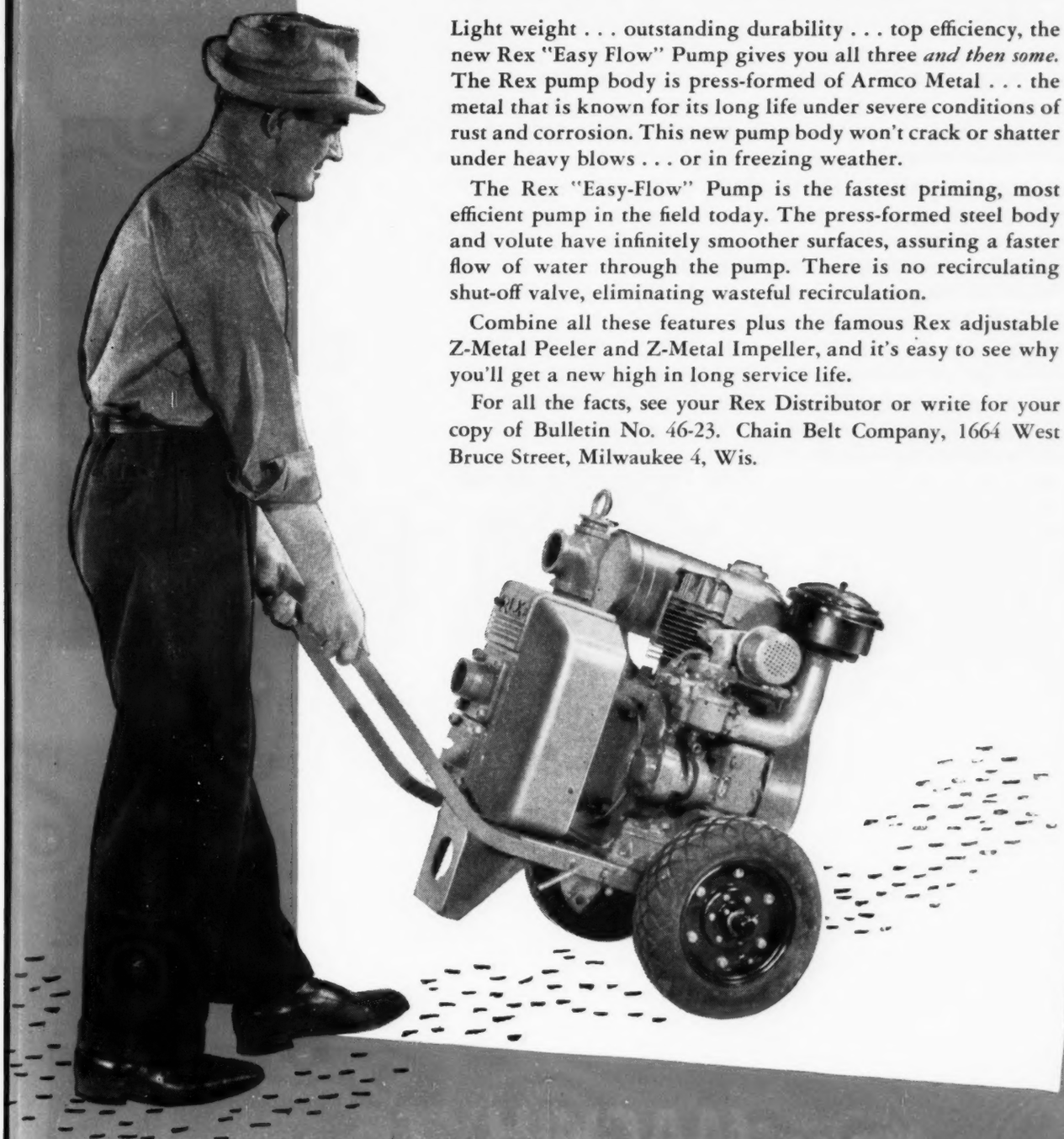
THE NEW REX *Easy Flow* SPEED PRIME PUMP with the Press-Formed Body

Light weight . . . outstanding durability . . . top efficiency, the new Rex "Easy Flow" Pump gives you all three *and then some.* The Rex pump body is press-formed of Armco Metal . . . the metal that is known for its long life under severe conditions of rust and corrosion. This new pump body won't crack or shatter under heavy blows . . . or in freezing weather.

The Rex "Easy-Flow" Pump is the fastest priming, most efficient pump in the field today. The press-formed steel body and volute have infinitely smoother surfaces, assuring a faster flow of water through the pump. There is no recirculating shut-off valve, eliminating wasteful recirculation.

Combine all these features plus the famous Rex adjustable Z-Metal Peeler and Z-Metal Impeller, and it's easy to see why you'll get a new high in long service life.

For all the facts, see your Rex Distributor or write for your copy of Bulletin No. 46-23. Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wis.



REX

CHAIN BELT COMPANY OF MILWAUKEE

CONSTRUCTION MACHINERY

PUMPS

PAVERS

PUMPCRETES

MOTO-MIXERS

MIXERS

Macwhyte Wire Ropes include: MACWHYTE PREformed and Non-PREformed Internally Lubricated Wire Ropes . . . MONARCH WHYTE STRAND Wire Rope . . . Special Traction Elevator Rope . . . Stainless Steel Wire Rope . . . Monel Metal Wire Rope . . . Galvanized Wire Rope. Macwhyte also makes Atlas Braided Wire Rope Slings, Hi-Fatigue Aircraft Cables, Assemblies, Tie-Rods. Catalogs on request.

a thousand and one...

MACWHYTE WIRE ROPES...

all job-proved . . . assure you the correct rope for your equipment

When you use the correct wire rope, both the rope and your equipment last longer, cost less to operate. Macwhyte consulting engineers will check your equipment and recommend the wire rope specifically engineered for your job. Ask your Macwhyte distributor, or write Macwhyte Company.

MACWHYTE WIRE ROPE

Manufactured by Macwhyte Company

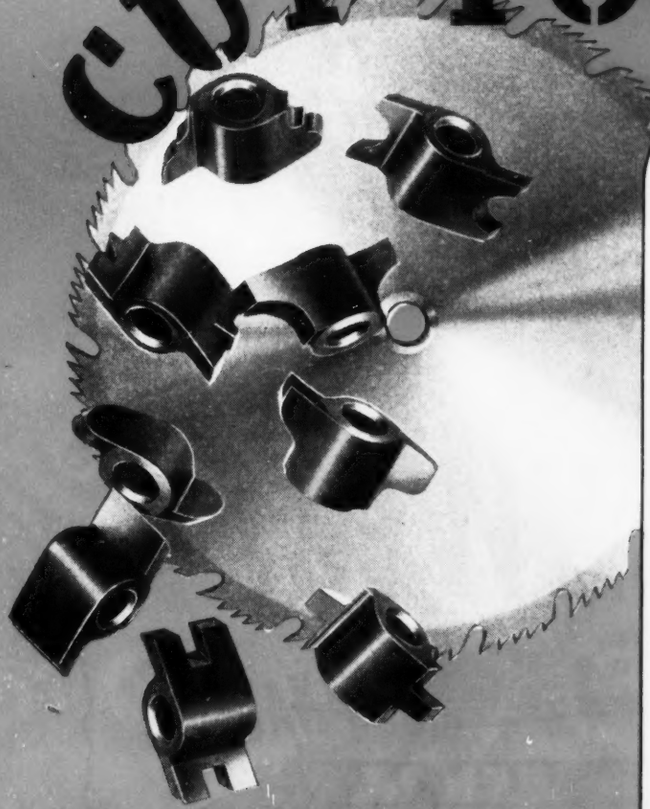
2941 Fourteenth Avenue, Kenosha, Wisconsin

Mill Depots: New York • Pittsburgh • Chicago • Minneapolis
Fort Worth • Portland • Seattle • San Francisco • Los Angeles
Distributors throughout the U. S. A. and other countries.

NO. 692

Make MACWHYTE your headquarters for WIRE ROPES

CUT YOUR COST



A Single MULTIPLEX

will perform all these wood working operations

QUICKLY - ACCURATELY - SAFELY

The Multiplex saw outperforms all others -- due primarily to its exclusive center pivot track which is also movable backward and forward on a rigid overarm. Provides the greatest flexibility and versatility yet obtained in any radial arm saw.

★ **Speeds up output and lowers costs. More mitering capacity - No idle travel of cutting head.**

★ **Performs almost any wood working operation -- cuts -- miters -- dado miters -- bevel miters left hand as well as conventional right hand up to 90° -- circle routing -- bevel circle routing -- shaping -- tenoning -- planing.**

★ **Greater accuracy and precision -- sturdily designed -- accurately machined -- rear column and overarm raised and lowered by means of removable crank at front of the table. Column is self-aligning and self-locking in any position. Ball bearing mounted yoke moves with exceptional ease. The yoke is adjustable to maintain accurate alignment.**

★ **Greater safety and convenience -- All controls on front of machine -- no reaching over saw blade -- self-retracting guard affords extra protection.**

DRILL PRESS ATTACHMENT -- The Multiplex Model 30A and 40A are quickly and easily converted to a high speed, ball bearing drill press with exclusive *Versatile Mounting. Valuable also for shaping and carving. Available with Multiplex drill press attachment are: Router and Multi-spur Bits Shaper Cutters - Carving Cutters - Emery Wheels Sanding Wheels - Wood Burrs - Rotary Planers.

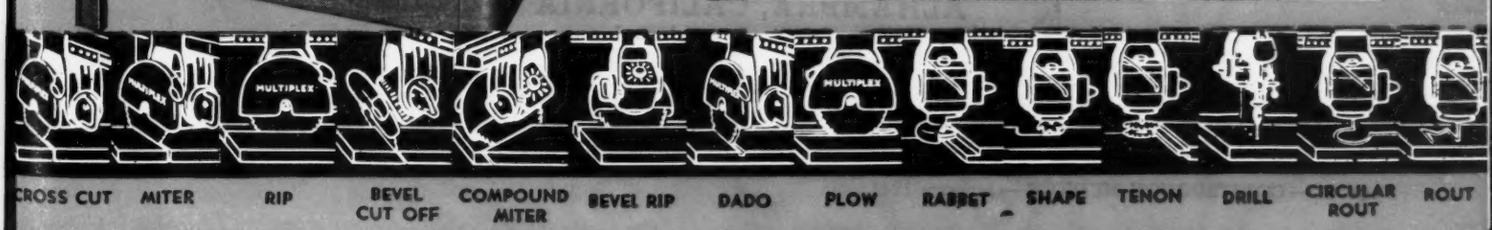
Write for full information and name of nearest dealer.

MULTIPLEX

Radial-Arm Saws

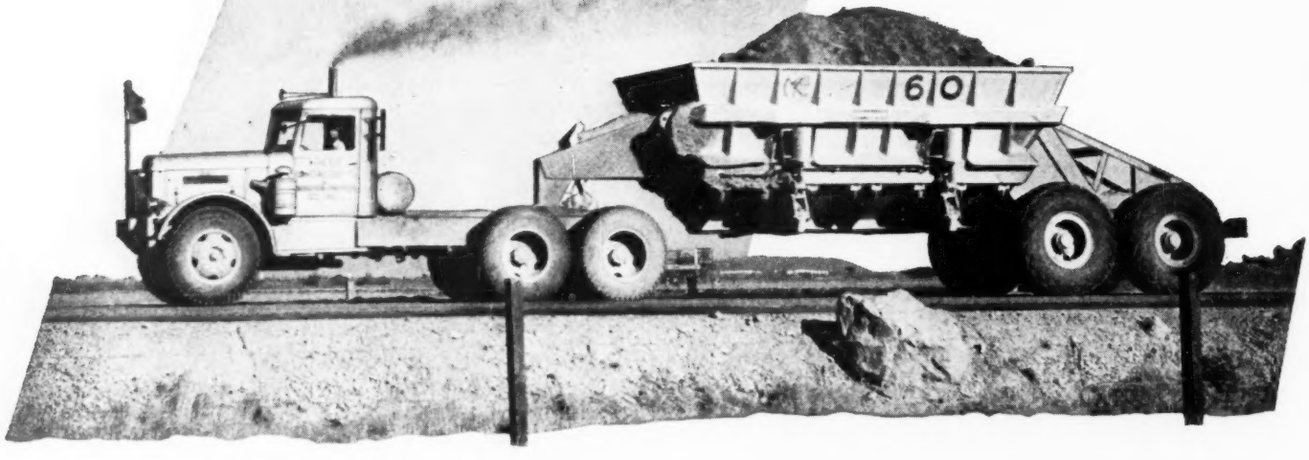
RED STAR PRODUCTS • INC.

3455 VEGA AVENUE, CLEVELAND, OHIO, U. S. A.



CROSS CUT | MITER | RIP | BEVEL CUT OFF | COMPOUND MITER | BEVEL RIP | DADO | PLOW | RABBET | SHAPE | TENON | DRILL | CIRCULAR ROUT | ROUT

Another FIRST! by SOUTHWEST



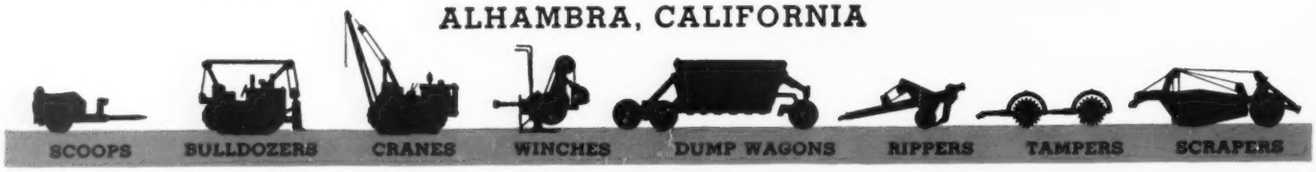
THIRTY NEW SOUTHWEST BOTTOM DUMP WAGONS are doing a big job for Macco Corporation and Morrison-Knudsen Co. at Mills Field, California. Each unit averages 70 YARDS PER HOUR, BANK MEASURE, ON A SIX TO EIGHT MILE ROUND TRIP HAUL. That's how to move "muck" and cut costs in a big way!

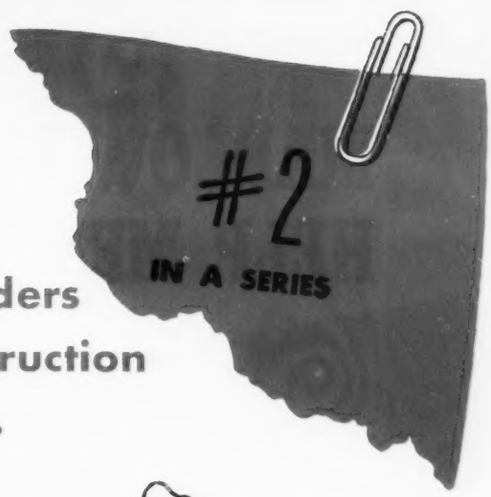
Southwest Wagons are engineered to fit YOUR tractor and suit YOUR needs. 30-CU. YD. water level—38-CU. YD. heaped capacity—Special heavy duty construction—Easy operating, air controlled bottom dump doors—Heavy duty bogie wheels—Air operated brakes. • Write for Bulletins on complete line of Southwest Construction Equipment.

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA





Moving forward with America's leaders in a mighty era of construction to build a greater America . . .

BAKELITE PLANT CONTRACT TO F. H. McGRAW & COMPANY

F. H. McGraw & Company, constructors of Hartford, Conn., with offices in Gary, has been awarded a contract totaling several million dollars by the Bakelite Corp., a unit of the Union Carbide & Carbon Corp., for the construction of a manufacturing plant at Ottawa, Ill., the company announced yesterday. The contract calls for the construction of a facturing building covering 135,000 square feet, with six bays, for the production of Vinylite plastic film and sheeting.

Reprinted with permission from "Chicago Journal of Commerce," October 21, 1946

F. H. McGRAW & COMPANY

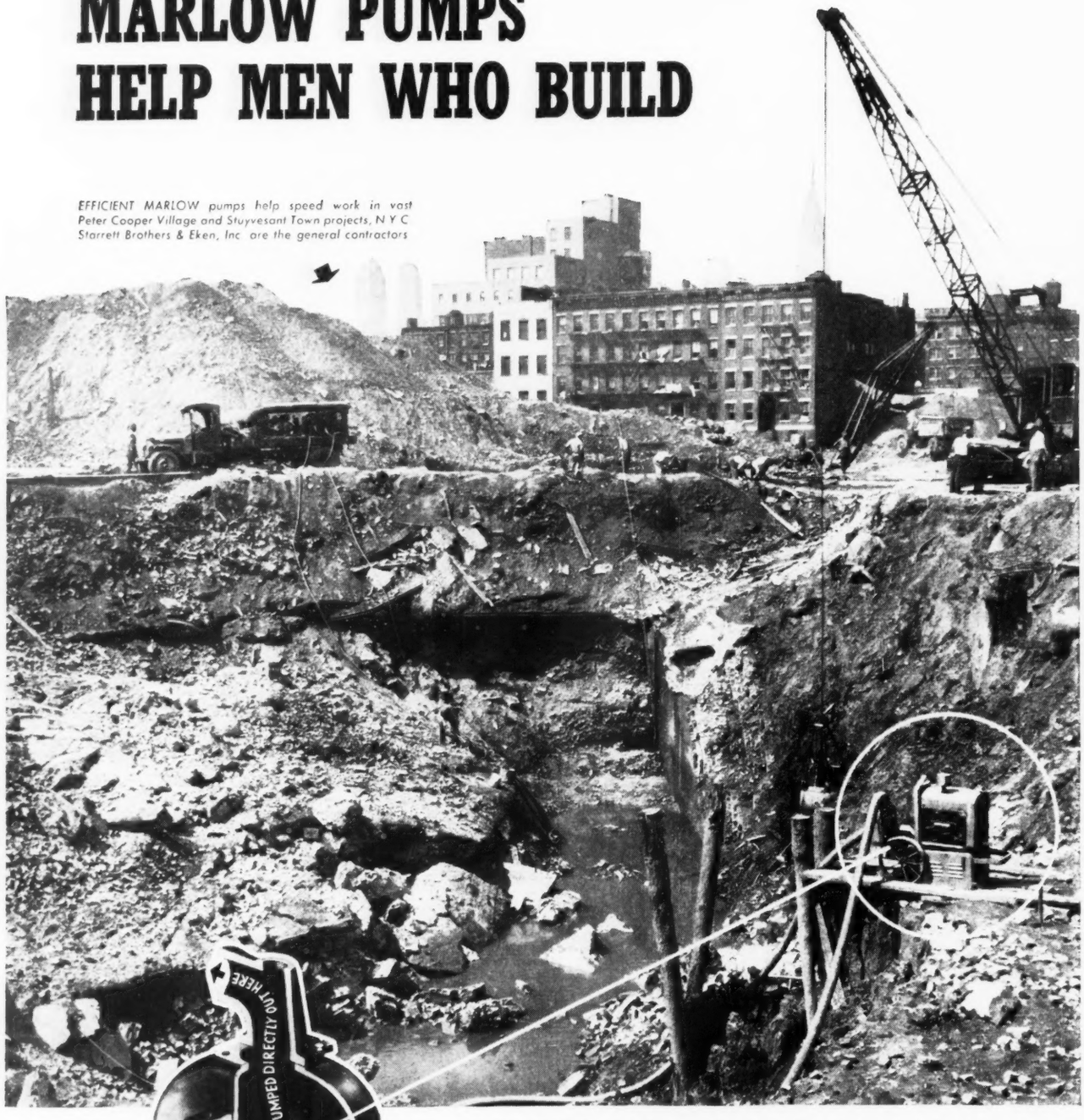
ENGINEERS AND CONSTRUCTORS

780 WINDSOR STREET · HARTFORD 1, CONN.

NEW YORK, N. Y. • CHICAGO, ILL. • GARY, IND. • MIDDLETOWN, O. • PITTSBURGH, PA.

MARLOW PUMPS HELP MEN WHO BUILD

EFFICIENT MARLOW pumps help speed work in vast Peter Cooper Village and Stuyvesant Town projects, N Y C Starrett Brothers & Eken, Inc are the general contractors

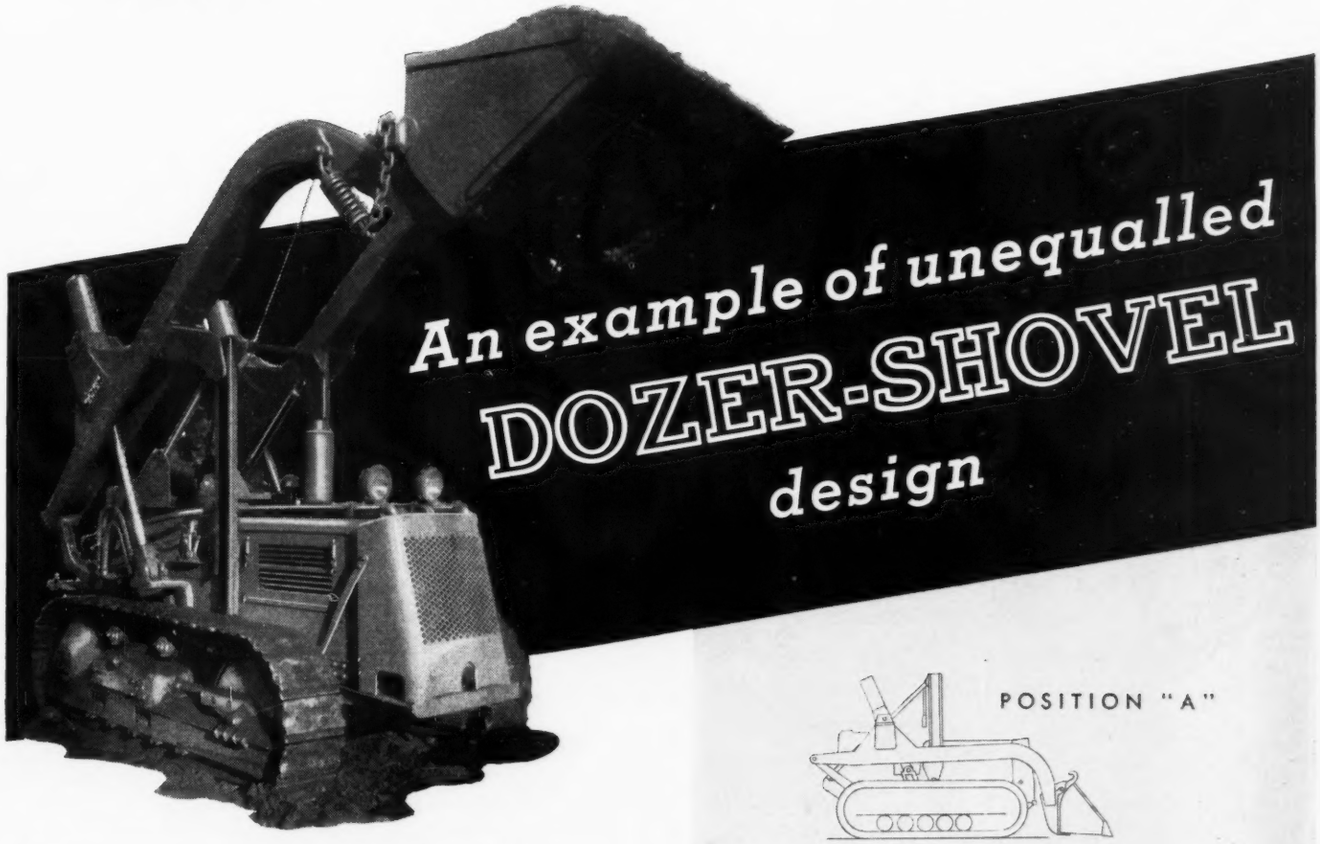


The simple trouble-free construction of a Marlow Self-Priming Centrifugal Pump enables it to prime and reprime positively and automatically. A Marlow has no ports, by-passes or other auxiliary priming devices that reduce pumping efficiency; it is soundly engineered and ruggedly made. For fast, dependable, thrifty pumping, you can't beat a Marlow.

Marlow literature is interesting and will be forwarded promptly on request.

MARLOW PUMPS · RIDGEWOOD, N. J.

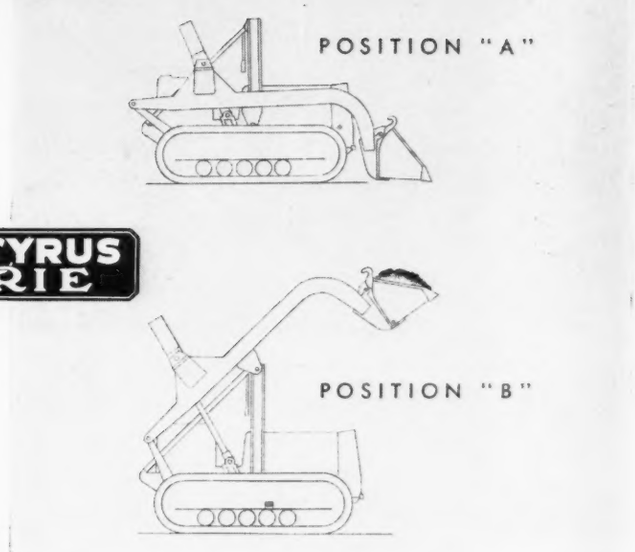
LOW EQUALIZER SPRING LOADS



All the inherent operating characteristics of International TracTracTors are retained when Bucyrus-Erie DOZER-SHOVELS are mounted on them.

BUCYRUS ERIE

Take the matter of TracTracTor equalizer-spring loads, for instance—it offers a typical example. Because of the DOZER-SHOVEL'S unique design by which forces balance and offset each other, equalizer-spring loads are never excessive, regardless of the position of the shovel bucket. Look at the illustrations given here: In position "A," when starting to lift the bucket, the guide rollers in the lift arm guides press forward against the front rail, tending to increase the load on the spring, but at the same time a balancing force is set up in the rocker arms which tends to reduce the load on the spring. In "B," both these tendencies are reversed. In all positions, these tendencies offset each other, with the result that the DOZER-SHOVEL attachment imposes no excessive weights on the TracTracTor equalizer spring. This is an exclusive Bucyrus-Erie feature! In a DOZER-SHOVEL and TracTracTor combination you have an earthmoving tool that converts full tractor speed, power, and flexibility into outstanding digging, loading, bulldozing, and lifting service. Ask your International TracTracTor distributor about such important features as oscillating tracks, exceptional versatility, full front visibility, low clearance, positive down pressure — all big contributors to big output. BUCYRUS-ERIE COMPANY, South Milwaukee, Wis.



52T46

See Your INTERNATIONAL TRACTRACTOR Distributor

Your Best Bet ✓

INTERNATIONAL Diesel Crawlers

● "This is an easy job for my International," said W. H. Kamp of Des Moines, Washington. He was removing and piling large stumps at Skyway Park, a housing project southeast of Seattle.

International Diesel Crawlers have the power, ground contact, hang-on and weight distribution that makes them ideal for this work. They clear land economically with bulldozers or special clearing dozers—and do it fast!

For evidence of the durability and matchless operating economy of these powerful crawlers, look at Mr. Kamp's TD-18. *It is 4½ years old, has given almost 10,000 hours of trouble-free performance and still has not had the pan off!* In that time it has yarded logs—hauling 25,000 board feet per day on 45% grades—and has done plenty of earth moving. At Skyway Park it built 7,000 feet of streets in 20 days of extremely wet Washington winter. This included opening up and clearing the land. Some stumps removed were ten feet in diameter and some of the rocks weighed as much as five tons. "This machine is just as true today as a new machine", says Mr. Kamp. "It is not sprung in the least and has never been off the tracks once. It has plenty of power. In fact, I do jobs like this with the throttle only ¾ open."

Mr. Kamp gets a big stump moving with his TD-18 and bulldozer. Note how the International's oscillating tracks keep the crawler poised to follow through.

For economical, dependable working horsepower you'll find International Diesel Crawlers your best bet. Ask the International Industrial Power Distributor near you for all the facts on current and forthcoming models.

Industrial Power Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

CRAWLER TRACTORS
POWER UNITS
DIESEL ENGINES
WHEEL TRACTORS

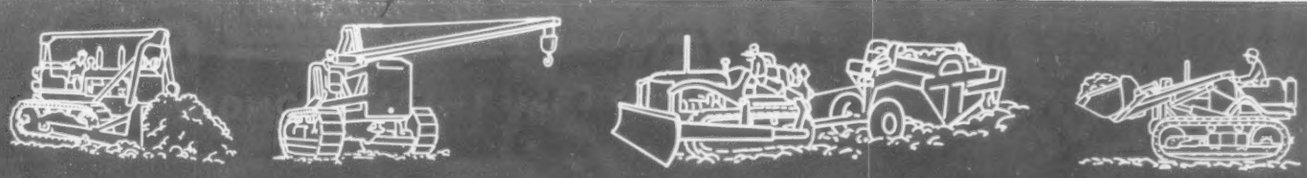
INTERNATIONAL

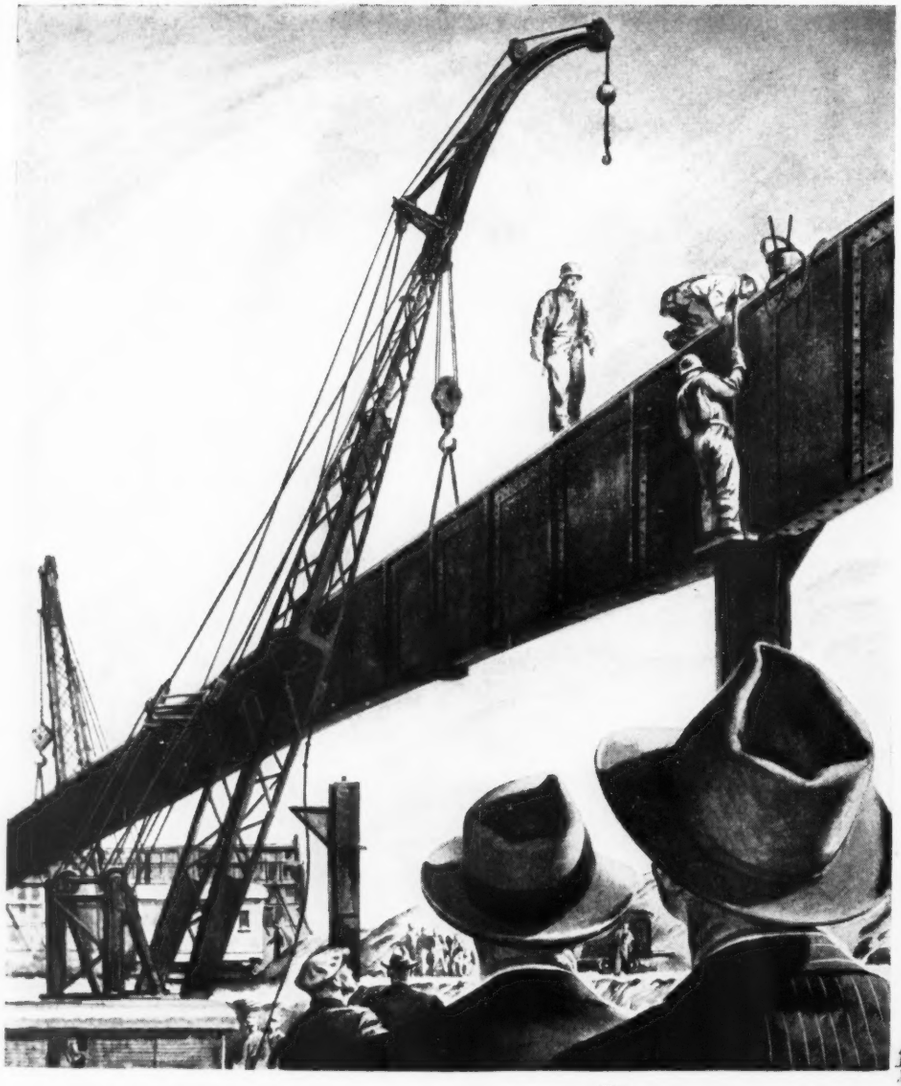
for Land Clearing

Roots out of the ground and pointed skyward. The International Diesel, under Mr. Kamp's experienced hand, rivals Paul Bunyan in stump removal. In two more minutes the stump's in the pile for burning.

INTERNATIONAL HARVESTER

Industrial Power

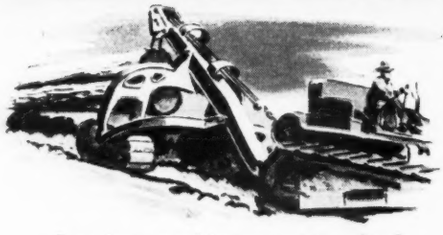




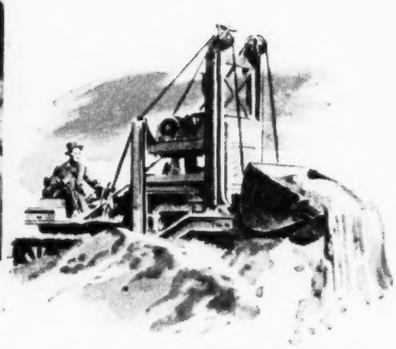
If you're a "Sidewalk Superintendent"

-watch the wire rope

Here's a show that scores a hit wherever it plays—building erection. These big cranes pick up steel girders and mesh them into place like the gears in your car. The star in the cab does it with levers and Preformed wire rope.



Logging machinery moves dead-weight logs with wire rope providing the sinews. Preformed wire rope gets top billing because it handles easier, resists kinking and stands the gaff.



Earth moving has come a long way since the day of the pick, shovel and wheelbarrow. Now bulldozers, shovels and trench hoes make the dirt fly—and their moving parts are actuated by wire rope, Preformed preferred.

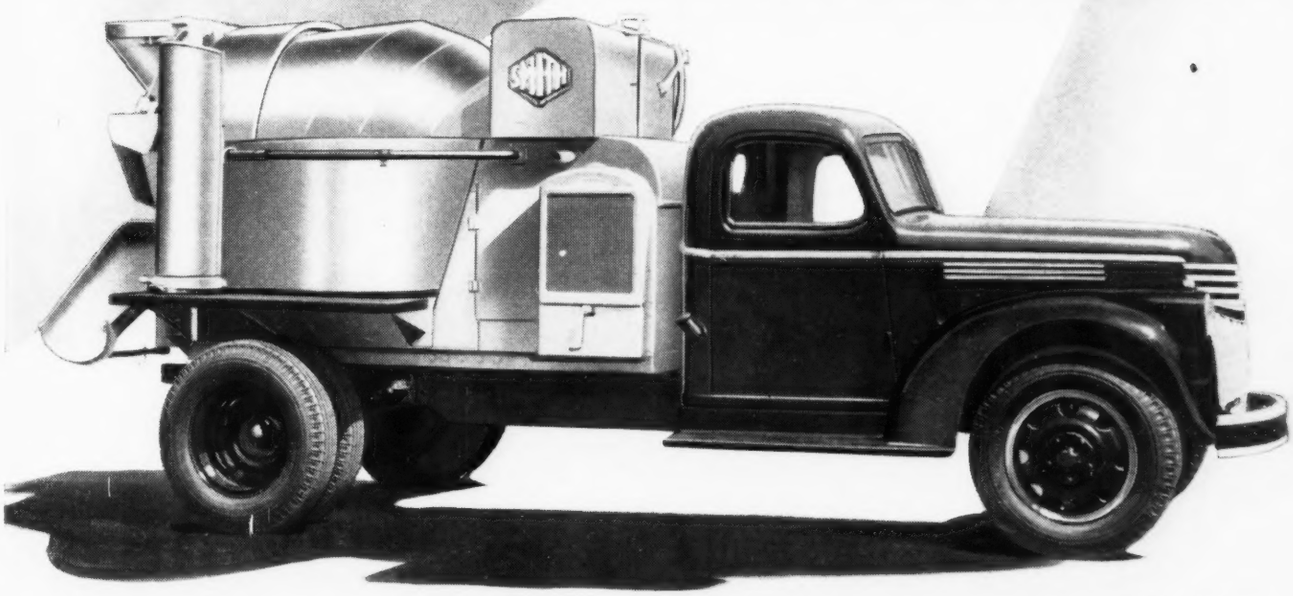
On jobs like these and hundreds of others the new wire rope —Preformed—is breaking old performance records. Operators like it because it's safer and handles easier. The office likes it because it lasts longer and reduces time lost for replacement. It makes money by saving money.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

IT HANDLES EASIER—LASTS LONGER

The SPOTLIGHT is still Focused on

SMITH-MOBILE!



Check these PLUS VALUES:

Dual water system, heated for winter operation . . . Improved, easy-to-operate chute lifter . . . Rubber mounting for bearings and gear case . . . Quickly accessible clutches . . . Improved sealing door . . . Accurate syphon-type tank . . . complete, streamlined enclosure for greater safety.

Improved, Streamlined Models Now About Ready for Delivery

12 years ago, SMITH-MOBILE made its initial appearance as the industry's first HIGH DISCHARGE truck mixer and agitator. It displaced the old style, horizontal drum "hatch-loaders" and rendered them thoroughly obsolete.

Now — SMITH-MOBILE again increases its acknowledged leadership in the field with a record of achievement unparalleled in the industry. To its many time-tested features: HIGH DISCHARGE . . . CONTROLLED DISCHARGE . . . VISIBLE MIXING . . . FEED CHUTE CHARGING . . . etc., are now added many other important refinements that make for even greater speed, efficiency and safety in operation.

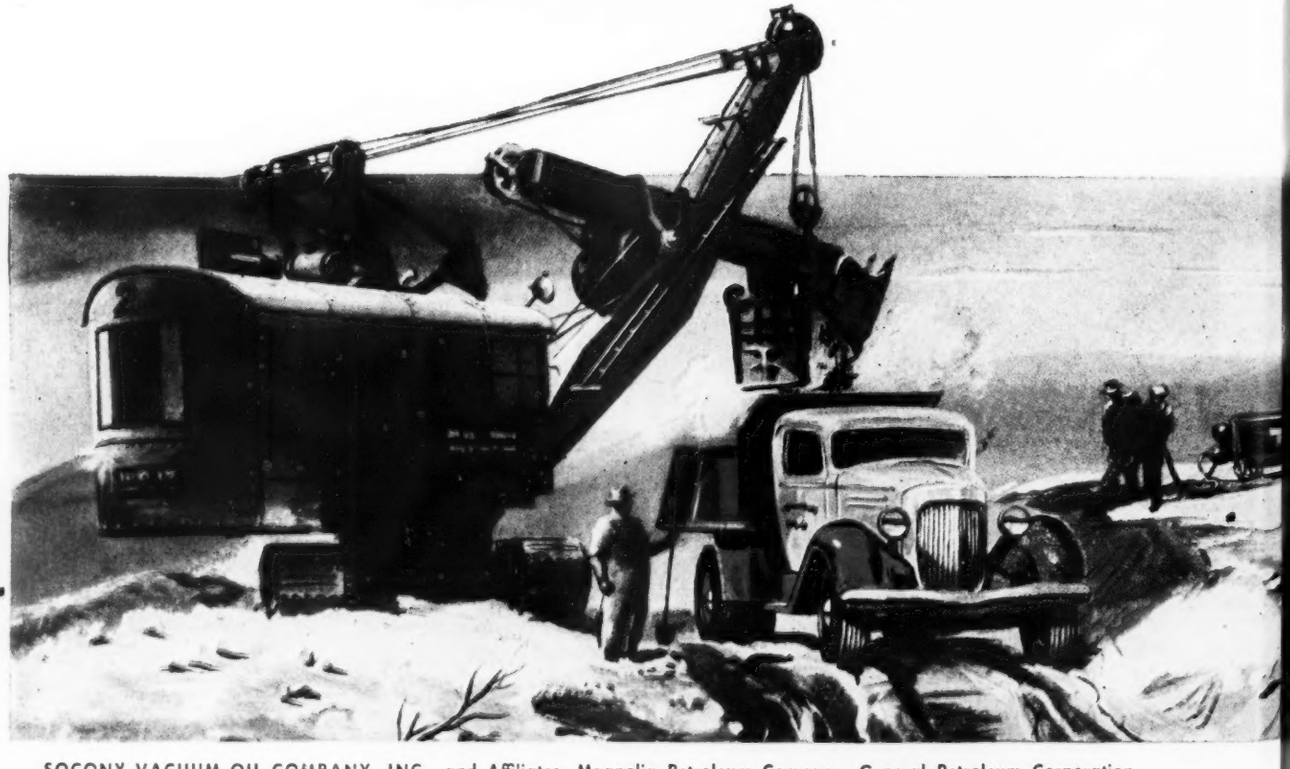
Built and guaranteed by SMITH . . . mixer manufacturers for more than forty-five years . . . SMITH-MOBILE is a thoroughly tried and proven product. At present, of course, the demand for this ultra-modern truck mixer greatly exceeds the supply. Deliveries, however, are being pushed ahead as rapidly as conditions permit. In the meantime, we suggest you write for new SMITH-MOBILE bulletin.

THE T. L. SMITH COMPANY

2851 N. 32nd Street, Milwaukee 10, Wis., U. S. A.

THE *Original* HIGH DISCHARGE TRUCK MIXER AND AGITATOR

Helps You Avoid Work Stoppages!



SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: Magnolia Petroleum Company General Petroleum Corporation

Here's Complete Lubrication Service — specifically designed to help you meet and beat contract dates!

Question: **Having too many *unscheduled* work slow-downs and stoppages — due to equipment failures?**

Answer: We can help you minimize "down-time" — keep hard-pushed machines operating full-tilt, full-time — by supplying you with exactly the right oil or grease for every application.

Question: **Does machine refueling and lubrication eat up too much valuable time in the field?**

Answer: We arrange on-the-job deliveries *wherever* you locate. This means fewer field interruptions, fewer inventory problems — minimum bother with rush orders, follow-ups.

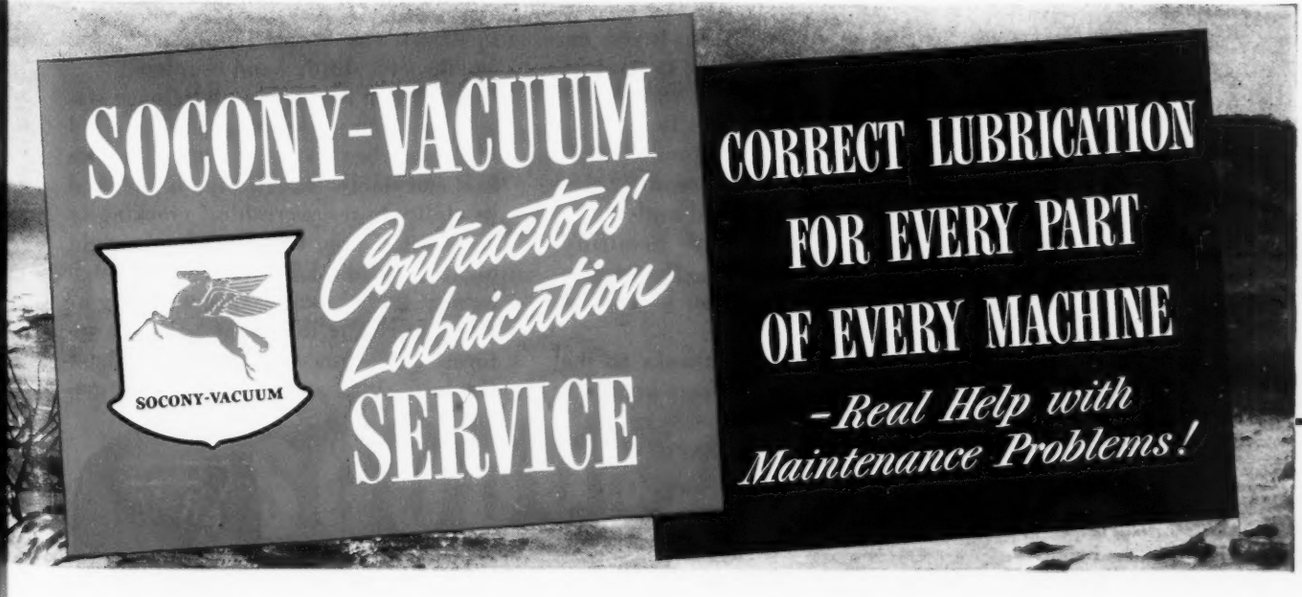
Question: **Having trouble finding a maintenance plan that fits your *individual* requirements?**

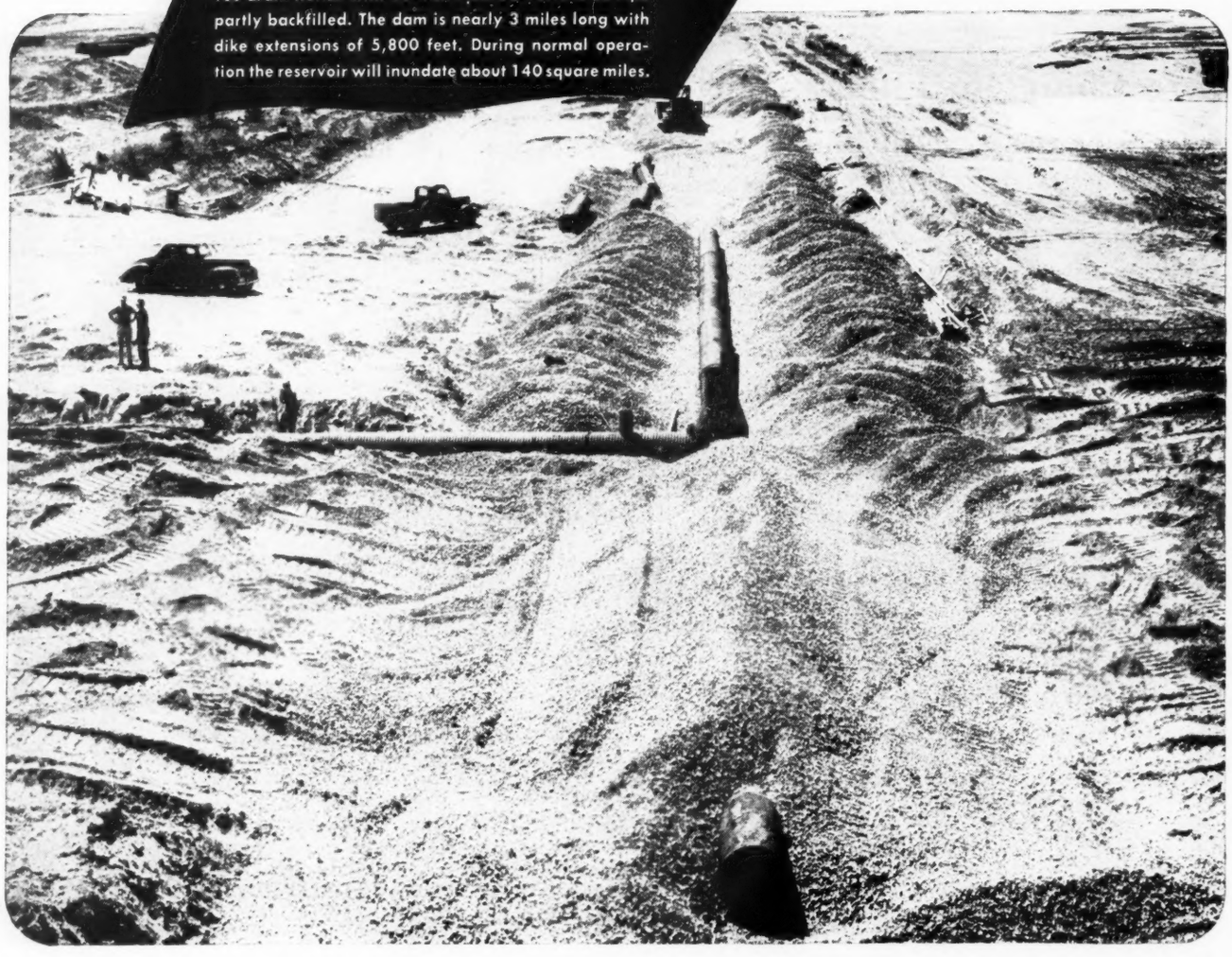
Answer: Our representative supplies you with tested maintenance schedules quickly and easily adaptable to *your* operating methods — *your* type of equipment — *your* maintenance set-up!

Question: **Are "problem" machines tying up other equipment . . . slowing vital operations?**

Answer: Your Socony-Vacuum Representative is trained to analyze and solve equipment problems. When necessary, he can also draw on our vast engineering staff for expert counsel. Call in this man today.

Why Be Satisfied Merely With "Gas and Oil" When You Can Get Complete Service!





Toe drain trench with 30-inch ARMCO Perforated Pipe partly backfilled. The dam is nearly 3 miles long with dike extensions of 5,800 feet. During normal operation the reservoir will inundate about 140 square miles.

THIS PIPE GUARDS A DAM AND 2 BILLION GALLONS OF WATER

At each junction of mains and laterals a corrugated metal manhole, reducing from 48 to 24 inches in diameter, provides access for cleanouts and inspections.

Here's how engineers employed an Armco subdrainage system to protect one of the world's largest rolled-fill earthen dams nearly 3 miles long.

The 30-inch ARMCO Perforated Pipe was installed under the dam with 12, 18, 24 and 30-inch laterals and outlets. By intercepting seepage water resulting from hydrostatic pressure, the system effectively prevents uplift or boiling on the downstream side.

Installation was easy, thanks to the lightweight and freedom from breakage of ARMCO Pipe. Tight joints, so essential to the safety of the dam, were assured by Armco's method of joining long pipe lengths with sturdy band couplers.

You'll find an Armco subdrainage system indicated wherever harmful ground water must be removed to keep subgrades firm and stable. ARMCO Pipe has proved its ability to resist crushing, cracking or disjointing under the impact and weight of heavy loads. Efficiency remains high because there is less chance of silting or clogging. Write today for complete information. Armco Drainage & Metal Products, Inc., and Associated Companies, 1325 Curtis St., Middletown, Ohio.

ARMCO PERFORATED PIPE

for Safe, Easy Operation

Husky, powerful machines . . . built to handle the most difficult work . . . yet, with OSGOOD Air Control, operating an OSGOOD is simple and easy. A bank of five hand levers and two foot pedals, all within convenient reach of the operator, provide safe, positive control of the principal operations of an OSGOOD.

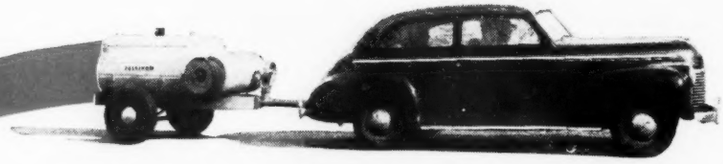
And OSGOOD Air Control is measured—low pressure for smooth, even operation, high pressure for powerful, steady travel. Here's ease of operation that means more work, in less time, on any job. Plan now to choose an OSGOOD . . . a complete line of power shovels, draglines, cranes, clamshells, backhoes and pile drivers . . . a model for every type of work.

POWER SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • BACKHOES • PILE DRIVERS

THE OSGOOD CO. O-G THE GENERAL CO. EXCAVATOR

MARION OHIO

DIESEL, GASOLINE OR ELECTRIC POWERED • ⅜ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES



PEAK AIR POWER
ON THE JOB

THE NEW
SULLIVAN
SERIES 80
PORTABLE
AIR
COMPRESSORS
ALWAYS DEPENDABLE

★ 2 STAGE COMPRESSION
★ MORE COMPACT DESIGN
★ Automatic "ECONO-MISER" LOAD CONTROL

W&D C501

Consult a Joy Engineer

Write for Bulletin

SULLIVAN

"The World's Most Modern Portable Compressed Air Plant"

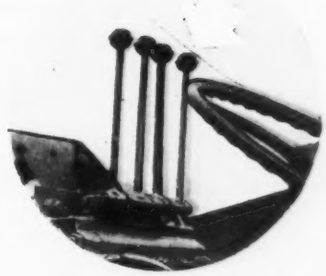
PORTABLE AIR COMPRESSORS FROM 60 TO 630 CFM

SULLIVAN DIVISION
JOY MANUFACTURING COMPANY
GENERAL OFFICES: HENRY W. OLIVER BUILDING, PITTSBURGH, PA.

It's Here!

ATHEY FORCE-FEED LOADER

The new Model 3 Athey Force-Feed Loader is here! As a result of five years field performance and engineering research, Athey proudly presents this latest addition to its line of loading and hauling equipment. Every State, County and Township Highway Department will find the new Model 3 the fastest, most economical answer to its loading problems. It is new in features of design — new in performance. Such design features as "Finger-Tip" hydraulic control, new conveyor design for faster loading, new protection for the power plant, greater operator comfort and better visibility are only a few of its outstanding developments. It's the last word for loading on road widening and resurfacing jobs, ditch building and cleaning, dressing slopes, loading oil mix, etc. It has smooth, clean pickup of all types of materials, high rate of production, one-man operation and "one-lane" loading which does not interfere with the normal flow of traffic. Investigate the new Model 3 today. See your Athey-"Caterpillar" Dealer, or write direct to ATHEY PRODUCTS CORPORATION, 5631 West 65th Street, Chicago 38, Illinois.



with "Finger-Tip" Hydraulic Control

Four levers operate the hydraulic controls for raising and lowering feeder, moldboard, throat and conveyor. The last word in operating simplicity and accurate control.

Athey DEPENDABLE LOADING AND HAULING EQUIPMENT

Split-Second Timing is the answer . . .

ATLAS ROCKMASTER BLASTING SYSTEM

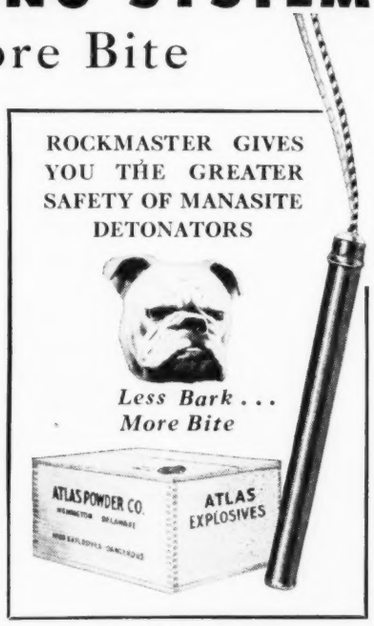
Gives You Less Bark . . . More Bite

In skiing, championship results come from the right equipment plus know-how plus split-second timing. With Rockmaster, the blaster is now able to time the delay elements of his shot in thousandths of a second—a control of timing never before possible. The impact it has brought to blasting is tremendous because after the rock is hit once, it is hit again . . . a split-second later . . . with sensational results.

The payoff in performance has been remarkable. In blasting operations all over the country fragmentation has increased—in many instances as much as 30%. Shovel efficiency has been stepped up. Secondary shooting has been held to a minimum. And . . . believe it or not . . . complaints about noise and vibration have become practically negligible in most cases, even when more holes are shot at one time!

Of course, split-second timing is only part of the answer. For Atlas Rockmaster is not just a device. Rockmaster is a complete blasting system. All factors of the blasting problem—detonators, explosive and loading—are taken into account and combined with your know-how and ours to produce true Rockmaster effectiveness.

Call in your Atlas representative. Ask him to tell you how our knowledge of explosives and your knowledge of the job can be combined to produce outstanding results.



Manasite Reg. U. S. Pat. Off. "ROCKMASTER"—Trademark

ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

THIS *Shouldn't Happen* to a construction job!

An overturned salamander . . . a hot rivet . . . or a welder's torch ignites a canvas windbreak and sets off a furious fire. Thousands of dollars of new construction ruined!

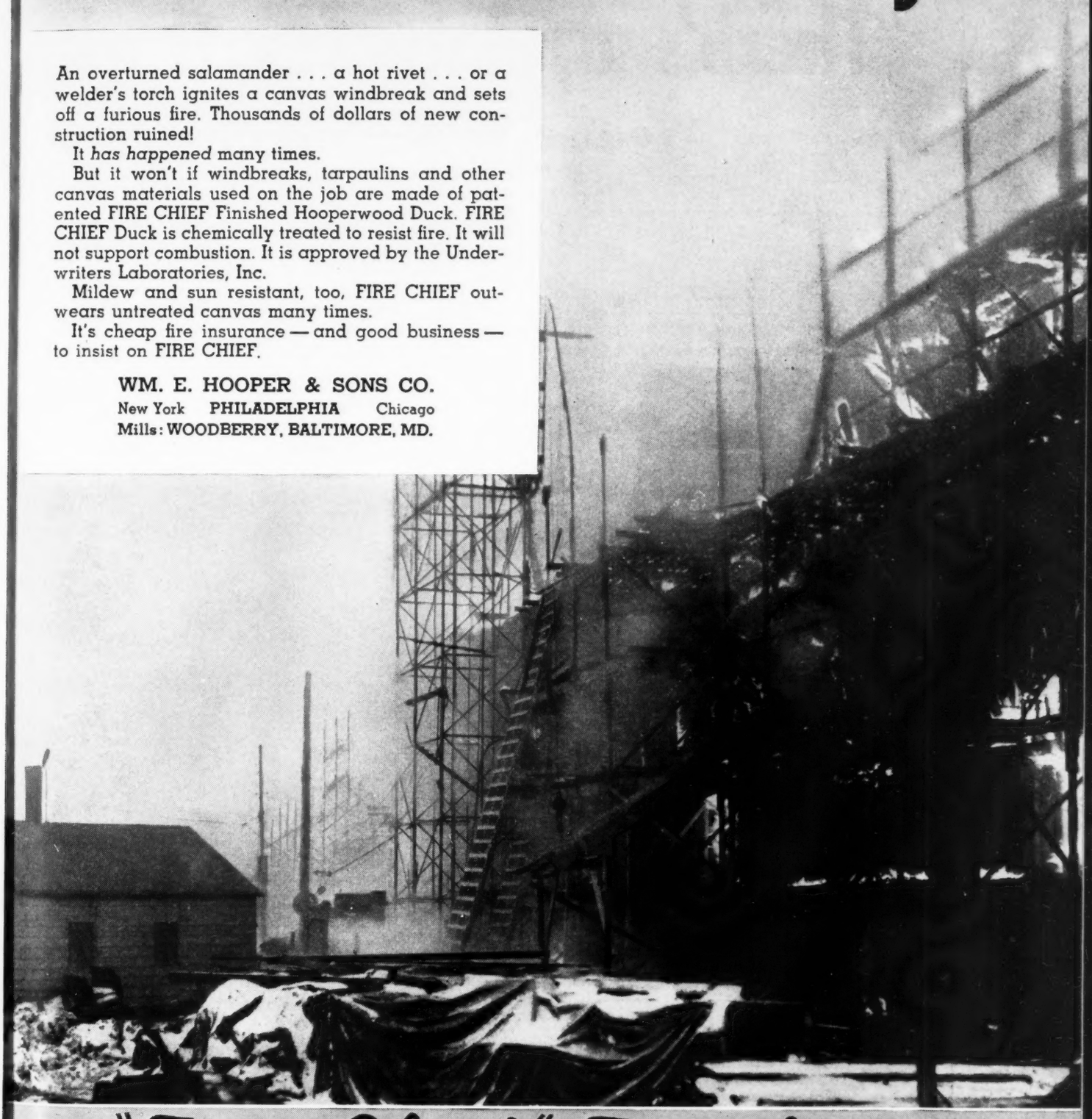
It *has happened* many times.

But it won't if windbreaks, tarpaulins and other canvas materials used on the job are made of patented FIRE CHIEF Finished Hooperwood Duck. FIRE CHIEF Duck is chemically treated to resist fire. It will not support combustion. It is approved by the Underwriters Laboratories, Inc.

Mildew and sun resistant, too, FIRE CHIEF outwears untreated canvas many times.

It's cheap fire insurance — and good business — to insist on FIRE CHIEF.

WM. E. HOOPER & SONS CO.
New York **PHILADELPHIA** Chicago
Mills: WOODBERRY, BALTIMORE, MD.



• "Fire-Chief" Finished •
TRADEMARK
U. S. Patent No. 2,299,612 and other patents

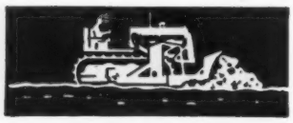
HOOPERWOOD COTTON DUCK

USERS
WRITE THE BEST ADS

"There's a place for tracks

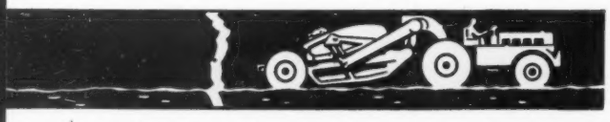
We use both—and they're all

"Caterpillar" builds the units you need to zone equipment for lowest costs on earth:



1 Track-type tractors for "push"-distance earthmoving.

2 Track-type tractors for loading and pulling scrapers on medium hauls.



3 Wheel-type tractors for high-speed long hauls —plus motor graders for finishing work.

CATERPILLAR

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ENGINES · TRACTORS · MOTOR GRADERS · EARTHMOVING EQUIPMENT

and a place for rubber

'Caterpillar' Diesels" —*Leon Joyce, Rochester, Minn.*

Straightening and elevating a section of new state highway near Preston, Minnesota, contractor Leon Joyce has cut yardage costs to a minimum with "Caterpillar" Zoned Equipment. That means making the most efficient use of both track-type and wheel-type tractors to move earth.

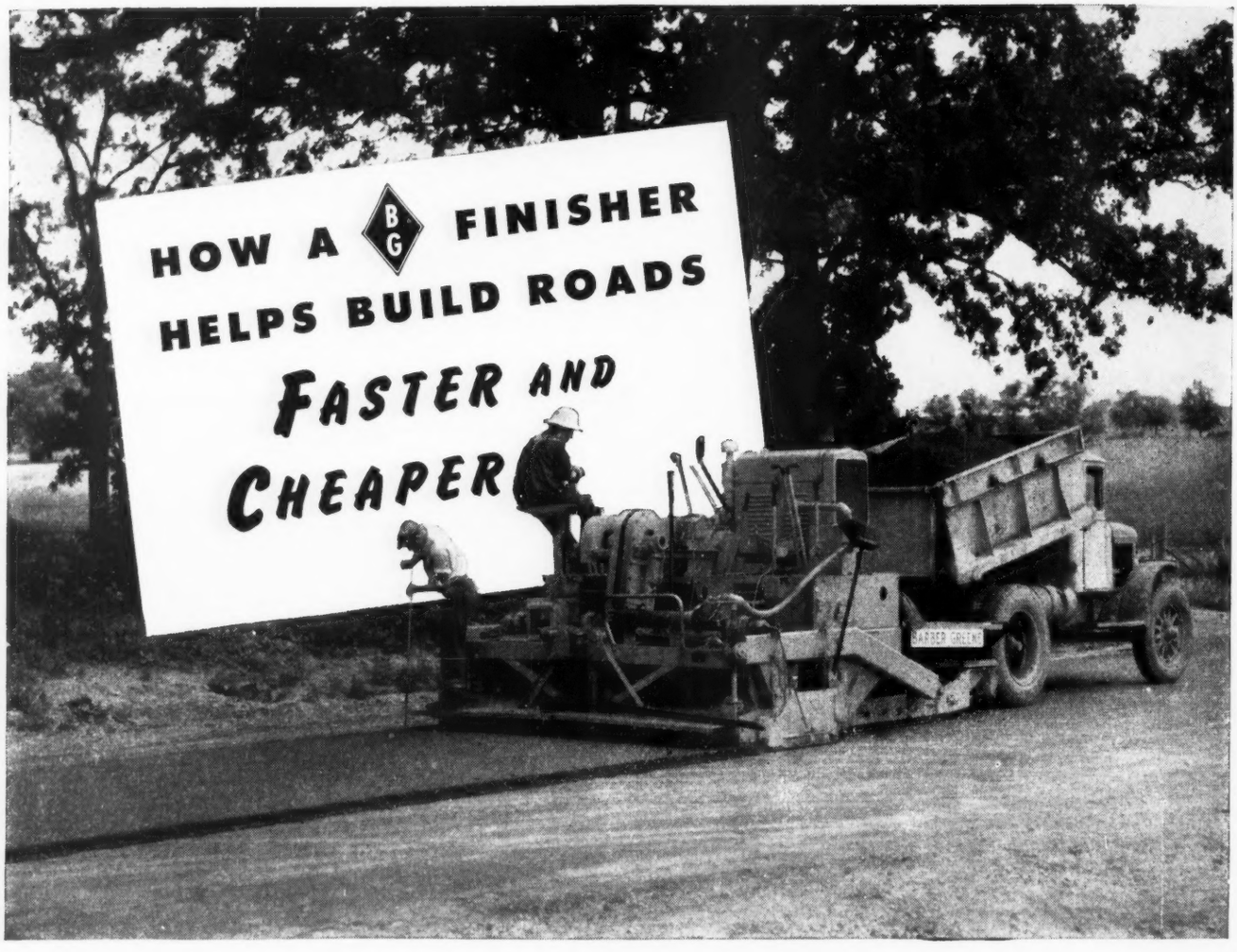
Included in Joyce's all-"Caterpillar" team are Diesel D8s and D7s, with the rugged traction for bulldozing, push-loading and pulling scrapers on short hauls; "Caterpillar" Diesel DW10 Tractors, making fast time on the two-mile scraper hauls required for this job; and "Caterpillar" Diesel Motor Graders to maintain haul roads and do the finishing.

As on most of today's big contracts, tracks and rubber fit together like gears in a machine. "Caterpillar" builds both—and backs both with the service of a great dealer organization.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

DIESEL

—for lowest costs on earth



• Here's a machine that performs three jobs at once. And you can keep it moving steadily—all day long. In rapid succession, truckloads of asphalt mix are mechanically spread . . . "kneaded" and thoroughly *tamped* in place . . . and automatically leveled—all in one operation.

Moreover, the Barber-Greene Tamping-Leveling Finisher helps provide fast, cheap road construction by reducing the amount of rolling for adequate compaction . . . eliminating hand labor behind the machine . . . decreasing truck delay . . . cutting out the hazards encountered in other methods.

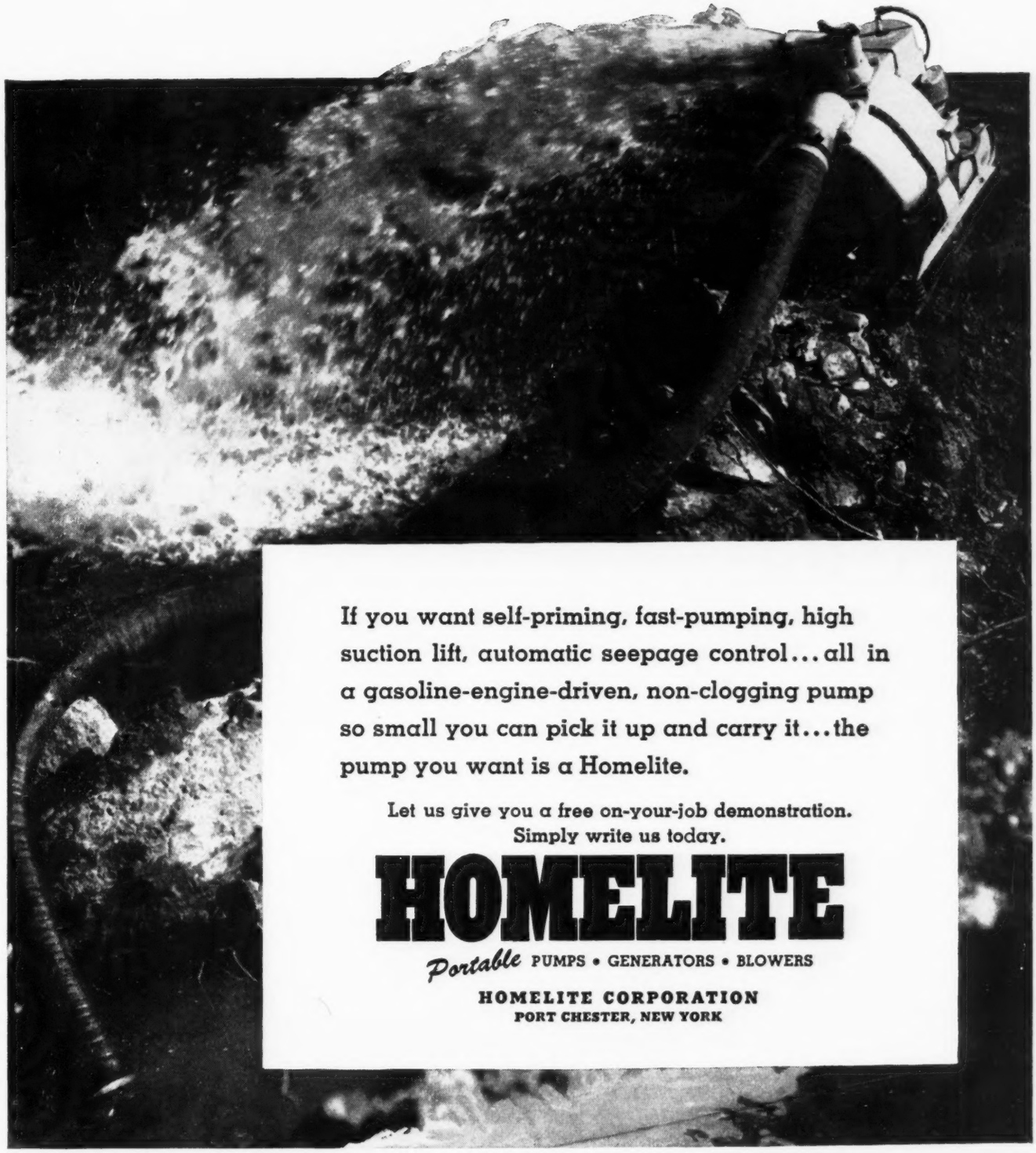
You'll find that a B-G Finisher saves days and dollars on every black top paving job. It handles mixes extremely difficult or impossible to lay by other means . . . maintains a mat of uniform thickness, ranging from ¼-inch to 6 inches . . . holds an accurate crown . . . and tightly seals joints with adjacent strips.

Before the call comes for the hurry-up resurfacing of worn-out highways, and the speedy construction of new roads and airports, plan to add a B-G *Tamping-Leveling* Finisher to your equipment. Write for literature outlining the functions and performance of this versatile machine. Barber-Greene Company, Aurora, Illinois.

45-8

Barber-Greene B G *Constant Flow Equipment*

The Pump
TO PUT ON THE JOB



If you want self-priming, fast-pumping, high suction lift, automatic seepage control... all in a gasoline-engine-driven, non-clogging pump so small you can pick it up and carry it... the pump you want is a Homelite.

Let us give you a free on-your-job demonstration.
Simply write us today.

HOMELITE

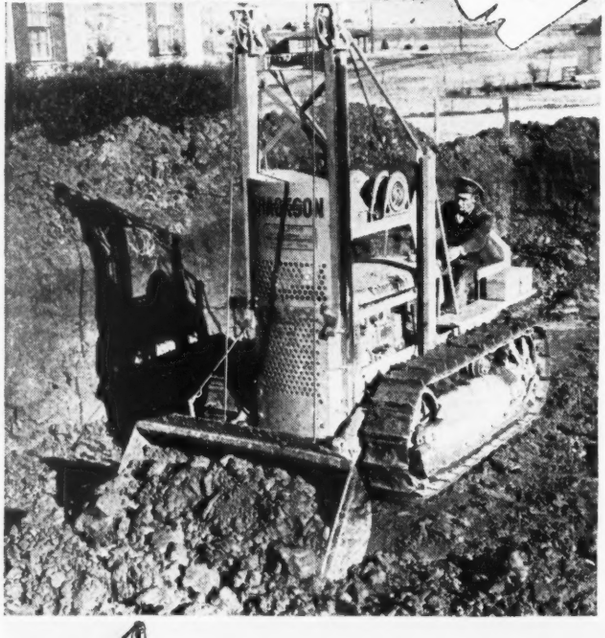
Portable PUMPS • GENERATORS • BLOWERS

HOMELITE CORPORATION
PORT CHESTER, NEW YORK

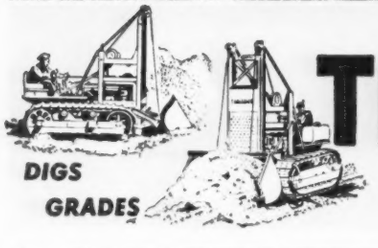
A SURE Way to do MORE Work on MORE Jobs at LOWER Cost . . .

TRAXCAVATE!

It's the MODERN Earth-Moving and Material-Handling Method.



Work is the word for TRAXCAVATORS! They're built to do more of it. Assign them to most any construction job and see the amazing number of tasks TRAXCAVATORS can perform. Pictured here is a big T7 stripping overburden — 2½ yds. at a bite; a Model T2 excavating a typical home basement in tough Oklahoma earth. There's versatility in TRAXCAVATORS — the kind that cuts corners on every contract — saves time and labor —turns an extra profit your way. Your TRACKSON-"Caterpillar" dealer can show you how it pays to Traxcavate and why TRAXCAVATORS do more work on more jobs at lower cost. He can help you select the size best suited to your particular needs. See him today, or write TRACKSON COMPANY, Dept. CM-17, Milwaukee 1, Wisconsin.



TRAXCAVATOR

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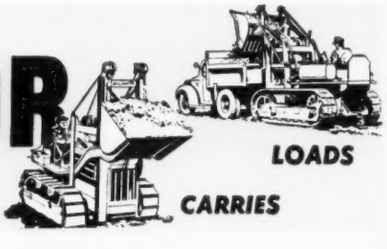
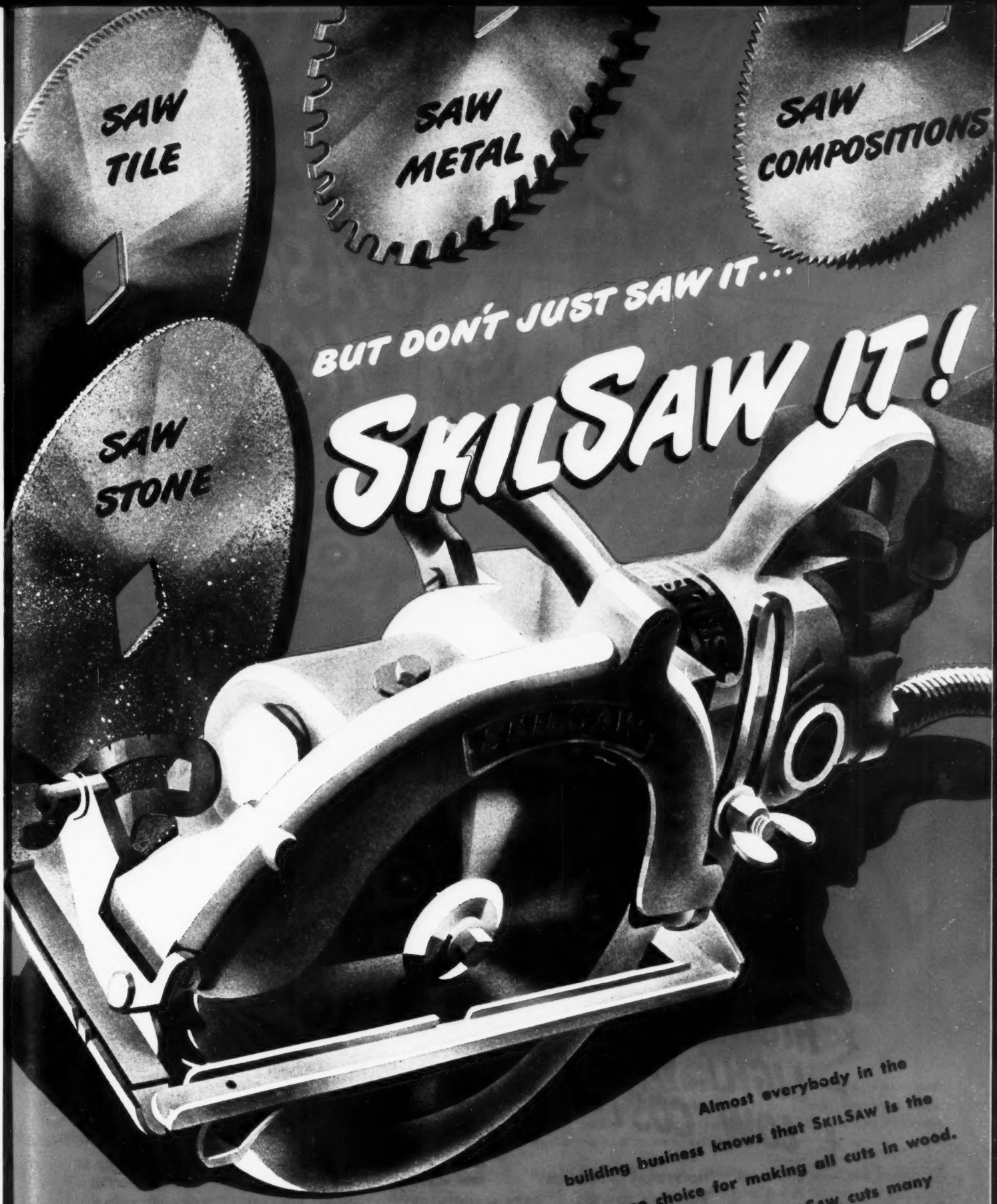
DIGS GRADES

THE ORIGINAL TRACTOR EXCAVATOR



LOADS CARRIES



ELECTRIC PNEUMATIC

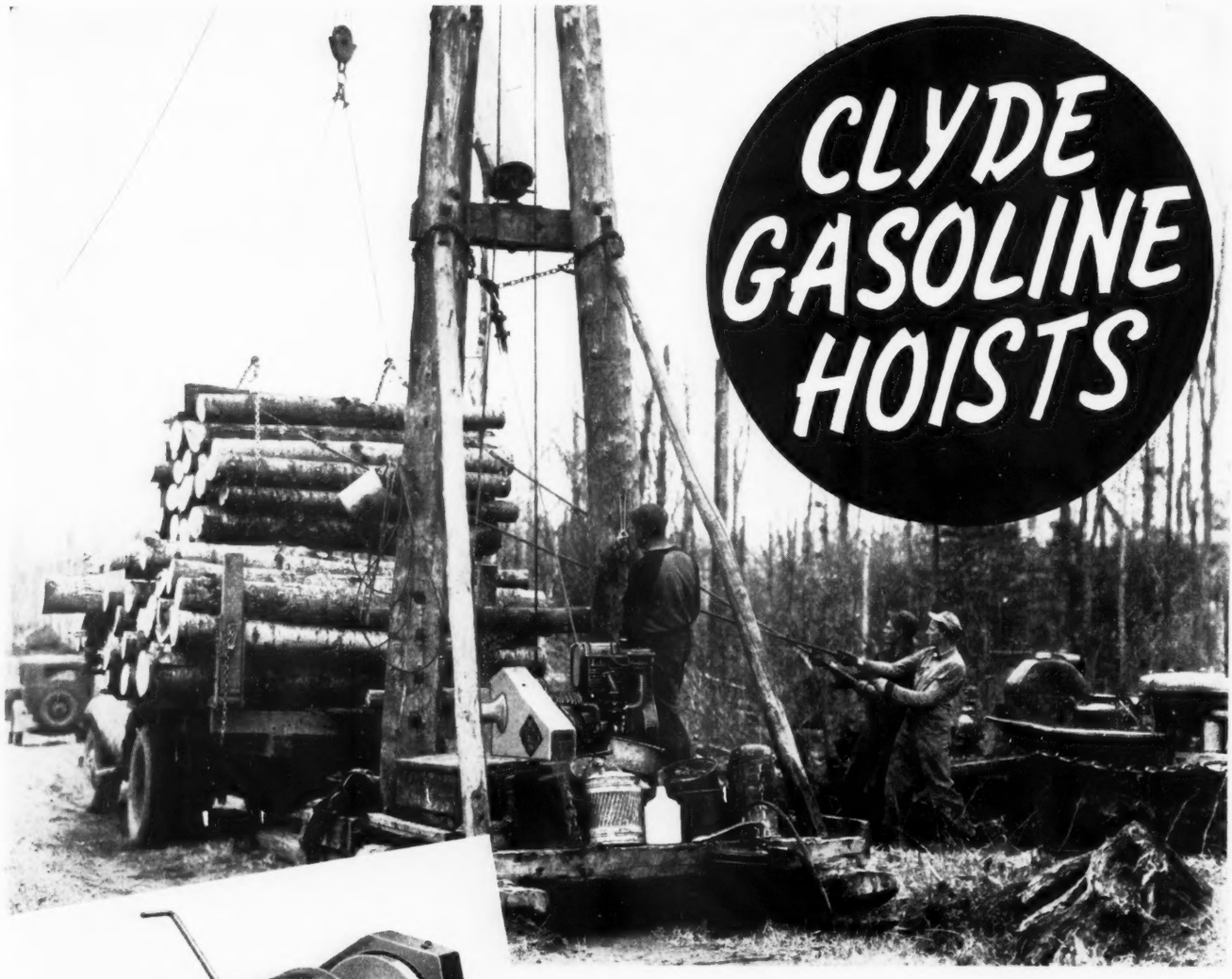
SKILTOOLS

SKILSAWS SKILSANDERS SKILNIBBLER SKILSHEAR SKILGRINDERS SKILDRILLS

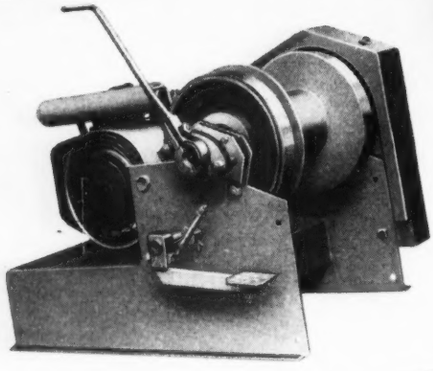
MADE BY SKILSAW, INC.

Almost everybody in the building business knows that SKILSAW is the number one choice for making all cuts in wood. But do you know that SKILSAW cuts many other materials, too . . . even wired glass? See your distributor today about a demonstration.

SKILSAW, INC.
5033 Elston Ave., Chicago 30, Illinois
Factory Branches in Principal Cities



CLYDE GASOLINE HOISTS



Clyde Frame 3 Gasoline Hoists are specifically engineered and built to handle your smaller hoisting jobs efficiently and economically.

They have a capacity of 3,000 lbs. on a single line, are light in weight, compact in size . . . ideal machines for profitable operation. The rugged simplicity of Clyde Frame 3 gasoline hoists means better and continuous service; no frequent or delicate adjustments required to maintain full hoist efficiency. For real hoisting value you can't beat this new little Clyde.

Write for descriptive circular on Clyde Frame 3 hoists. One or two drum sizes available.

★ HIGH QUALITY
★ LIGHT WEIGHT
★ LOW COST

HOISTS . . . DERRICKS . . . WHIRLEYS . . . CAR PULLERS . . . HAND POWERS
BUILDERS TOWERS . . . DECK MACHINERY . . . TANDEM ROLLERS . . . LOGGING EQUIP.

CLYDE

Manufactured by

CLYDE IRON WORKS, Inc.
Duluth 1, Minnesota

KEEP Construction Moving...

with Mall REG. U.S. PAT. OFF.

PORTABLE POWER TOOLS

If shortages in time, labor and materials stalemate your construction schedules, use Mall Portable Power Tools—they minimize scarcities and keep building moving toward a profitable completion. Their power and stamina speed construction . . . their ease of operation simplifies building processes . . . their accuracy eliminates waste.

MALLSAWS—facilitate multiple cutting of like members—notch rafters—trim floor and roof decking—put construction on a production basis. 2", 2¼", 2⅞" and 4½" capacities available for 110-volt AC-DC or 220-volt AC-DC.

MALL CONCRETE VIBRATORS—place a stiffer mix concrete five times faster than hand puddling. A size and type is available for every job—powered by 1½ or 3 H.P. Gasoline Engine, 7500 r.p.m. Pneumatic and 1½ H.P. Electric units. Gasoline Engine Power Unit operates 8 other tools.

MALL CHAIN SAWS—can be used for clearing timber lands—or for cutting rough timbers and heavy pilings. Pneumatic model can be used under water. Gasoline Engine, Electric and Pneumatic models available in many cutting capacities.

MALLDRILLS—power-packed for drilling wood and metal. ½" model cuts 1" holes in concrete form boards for ties and clamps—cuts ½" holes in steel. Other models with ¼" (in two speeds), 5/16" and ⅜" capacities available. All have universal motors.

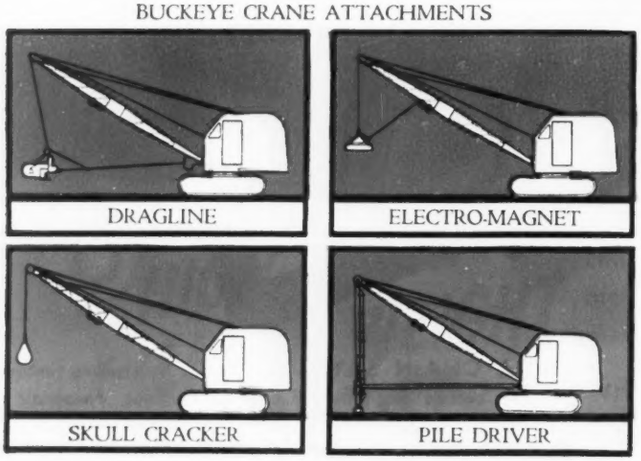
MALL TOOL COMPANY
7757 SOUTH CHICAGO AVENUE
CHICAGO 19, ILLINOIS

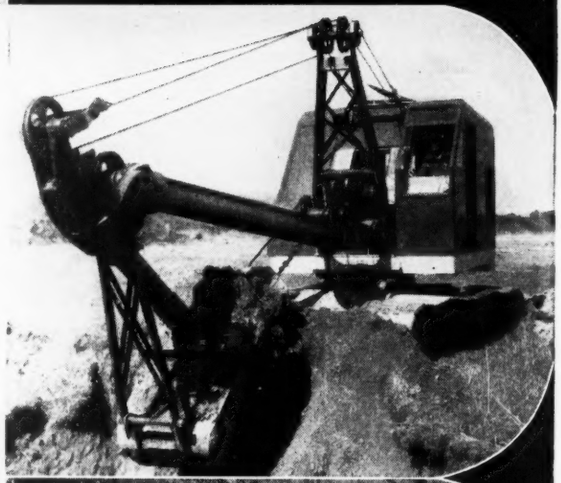
Get the Facts on BUCKEYE SHOVELS

The new Buckeye Shovel Catalog fully describes and illustrates all Buckeye shovels, trench hoes, cranes and crane attachments. Complete dimensions and specifications are detailed for every Buckeye machine. The many advantages of exclusive Vacuum Power Control are explained . . . the feature that has made Buckeye the outstanding shovel in its class. Designed as a reference guide, this new Buckeye catalog can be used to advantage when considering new equipment to meet your overall job demands. Write for your copy of the new Buckeye Catalog No. 846 today.

BUCKEYE TRACTION DITCHER
Division of Gar Wood Industries, Inc.
Findlay **Ohio**

BUCKEYE CRANE ATTACHMENTS





Write for the New BUCKEYE SHOVEL Catalog No. 846

Cultivate Good Buying Habits . . . Now

Buckeye

GAR WOOD INDUSTRIES

CONVERTIBLE SHOVELS • ROAD WIDENERS • TRENCHERS • SPREADERS • FINEGRADERS

The GALION 102 "Keeps its wheels on the ground"

13,550 lbs.
BLADE PRESSURE!
That's more than enough to easily handle your toughest road construction job.

*23,900 lbs. of *Engineered Weight!*

***TOTAL WEIGHT WITH SCARIFIER**

But weight is not put on the Galion 102 Grader just for the sake of weight—every pound on the 102 serves an important purpose—and this weight is so engineered into the design that fully 65-70% of it is placed over the rear wheels where it adds greatly to the effectiveness of Galion's famed tractive power.

This proper distribution of weight means that it is not necessary to add calcium chloride or other dead weights in the rear tires to secure sufficient tractive power. The Galion 102 really "keeps its wheels on the ground," its blade biting in, and moves relentlessly forward until the job is finished.

Catalog No. 290 describes in detail the many advanced operating features of the Galion 102 —write for a copy and name of nearest GALION Distributor.

GALION FEATURES THAT ASSURE TOP-PERFORMANCE

- Large front tires—same size as rear. . . . .
- Combination hand and hydraulic steering.
- Rugged box-type main frame. . . . . .
- Gear-type, four-wheel tandem drive. . . . .
- Full hydraulic control—low pressure system.
- Heavy front axle construction. . . . . .
- Blade pressure of 13,500 lbs. . . . . .
- Powerful, quick-starting, full Diesel motor. .

THE GALION IRON WORKS & MFG. CO.
GENERAL AND EXPORT SALES OFFICES
GALION, OHIO, U. S. A.

GALION IRON WORKS
GRADERS • ROLLERS

This truck has made 400,000 miles without engine trouble... with Stanolube HD

The William Klipsches, Sr. and Jr., of the William Klipsch & Son Coal Company, St. Louis, Missouri, talk over the splendid performance of their 25-ton hopper-type truck.

IN the William Klipsch & Son Coal Company fleet of 19 trucks many have gone more than a million miles and are still going strong. Going strong with tough, dirty, grinding work—hauling coal, load after heavy load, day-in and day-out.

In this fleet there is one particularly hard-working unit. It's a specially-designed, 25-ton, hopper-bottom, coal truck. When this truck was put into service, Mr. Klipsch decided to try a heavy duty, detergent-type motor oil. He felt that such an oil would help cut maintenance on his older trucks and ward off trouble in the new and vitally important 25-ton unit. He picked Stanolube HD.

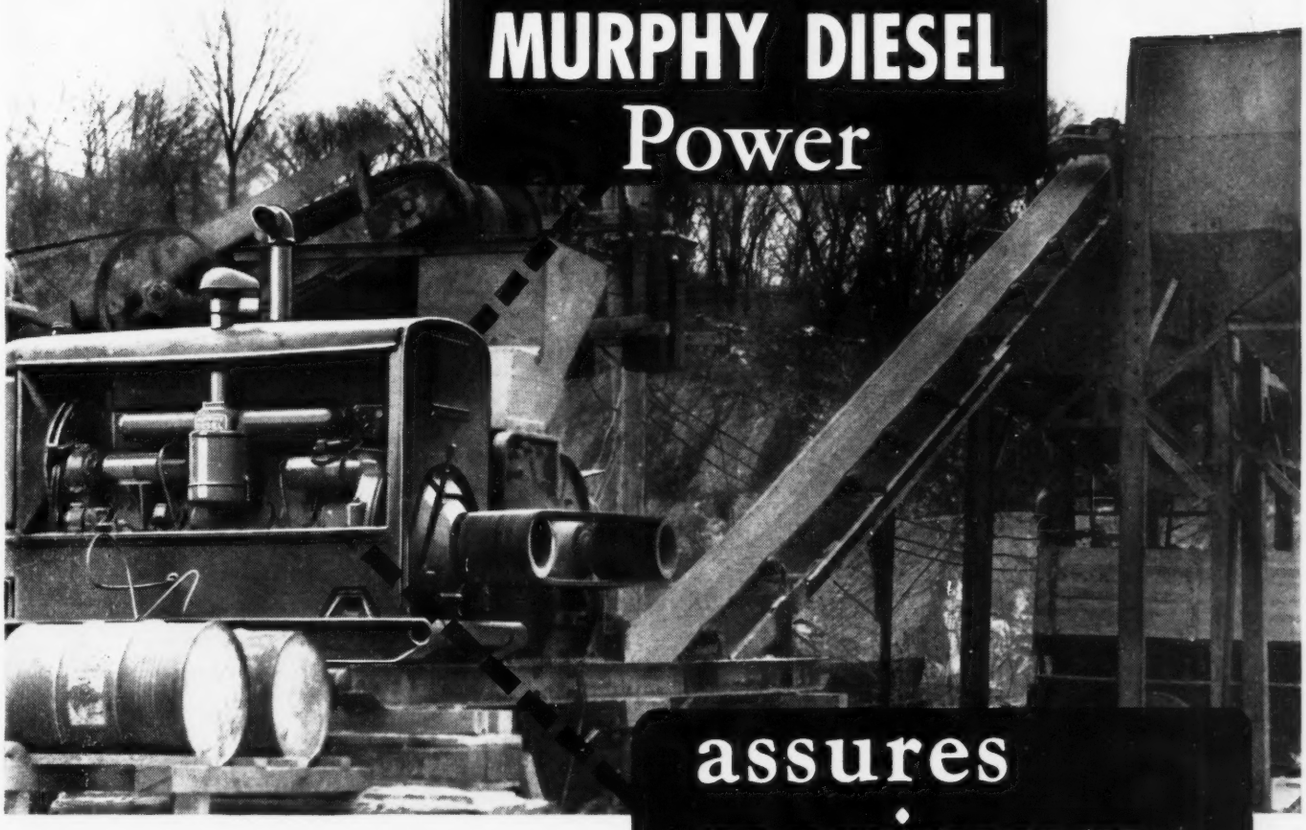
Results have been excellent. In the older trucks, distance between overhauls has been increased to 150,000 miles. Engines show complete lack of sludge and almost no varnish. And the special hopper truck has lost no time due to faulty engine performance in well over 100,000 miles of steady daily driving.

Many unusual records like this have been made by fleets using Stanolube HD. You can find out for yourself how Stanolube cuts maintenance costs and delays, just by asking a Standard Oil Automotive Engineer to test it in one of your hard-working trucks. And this Engineer stands ready at any time to help you set up a preventive maintenance plan designed to get maximum life and power from every unit in your fleet.

Just write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

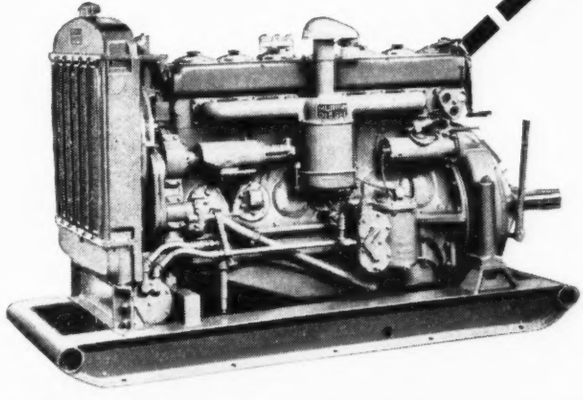
STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

Dependable MURPHY DIESEL Power



assures maximum production

Model ME-6, 6-cyl., 5¾x6½" MURPHY DIESEL Engine, 135 HP continuous, 160 HP intermittent, powering a Model 3033 Iowa Manufacturing Company Pulverizer owned by Concrete Materials & Construction Co., Cedar Rapids, Iowa, at their Otis quarry . . . reducing limestone from 25-40 Jaw crusher to 97% through No. 8 mesh screen at rate of 40 tons per hour.



WITH MURPHY DIESEL power on the job, you are sure of dependable, economical power, instantly responsive to heavy loads, *when* and *as* they come.

MURPHY DIESEL Engines and Generator Sets are compact, light in weight but engineered to be always ready for heavy-duty service on all types of heavy-duty construction and industrial equipment.

Specify MURPHY DIESELS when you buy new equipment or when re-powering. Write for details.

125

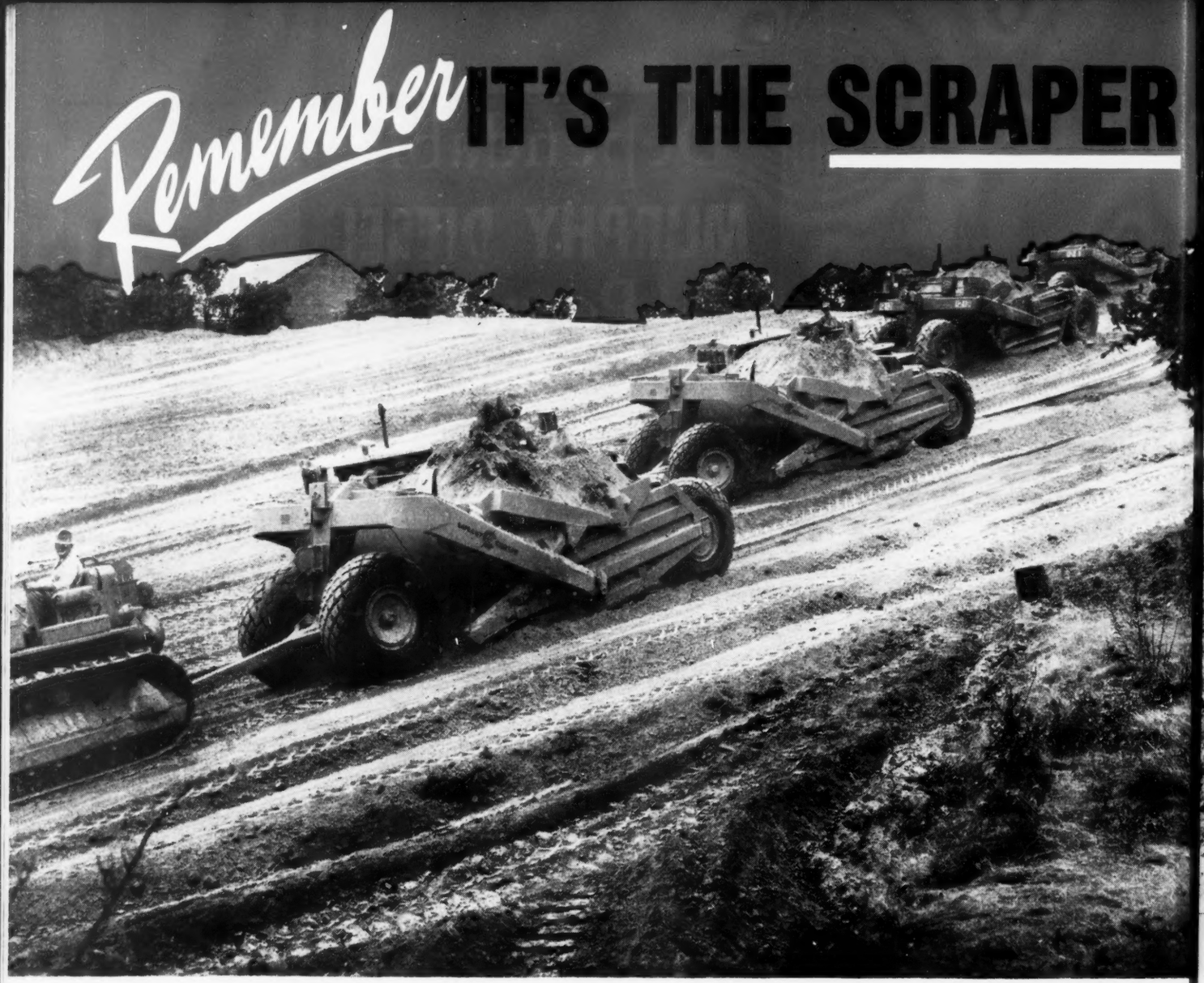
MURPHY DIESEL COMPANY

Dependable **HEAVY-DUTY** *Power*

ENGINES: 90 HP TO 215 HP • GENERATOR SETS: 60 KW TO 115 KW

5339 W. BURNHAM STREET, MILWAUKEE 14, WISCONSIN

Remember IT'S THE SCRAPER



. . . AND COMPETITIVE TESTS PROVE THAT LaPLANT-CHOATE SCRAPERS LEAD THE FIELD IN PROFIT-EARNING PRODUCTION

In the final analysis, *any make* of crawler tractor with sufficient horsepower will do a reasonably good job of handling a scraper. But, when it comes to selecting *the right scraper,* it's an entirely different story. Some scraper outfits get heaping loads in double-quick time. Others take much longer—even with the aid of a pusher. Some will carry a smooth, even spread in high gear, while others are slow and uncertain—especially in wet or bulky materials. Some scrapers make efficient use of tractor power—others burn it up by lugging around "an extra yard of dead-weight" that they never get rid of. (And that's the type of a load you never get paid for.)

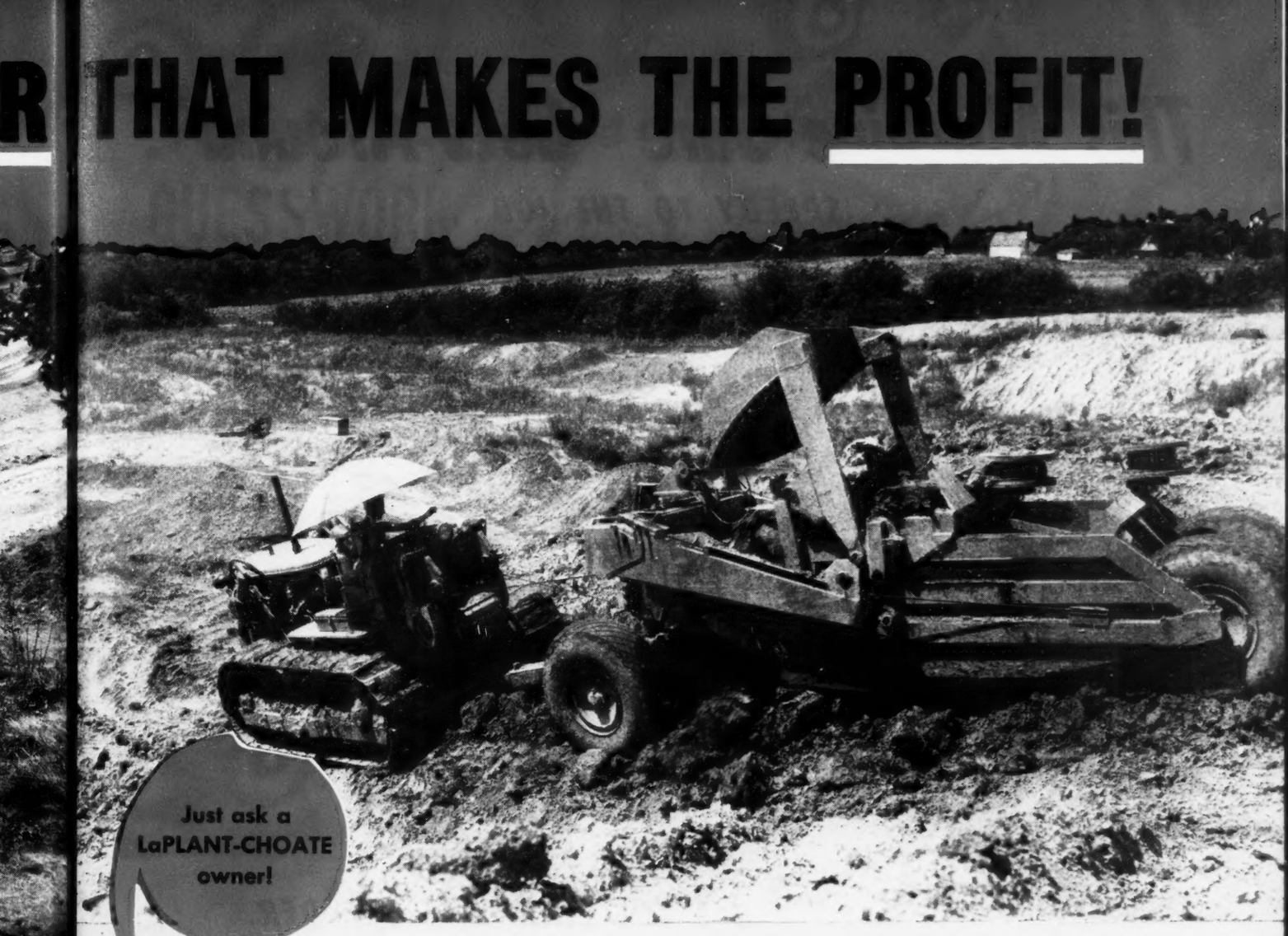
The point is—regardless of what tractor you use, there's *a whale of a difference in scraper performance.* And that difference in the scraper can easily "make or break" the profit on a close-bid job. That's why more and more smart dirtmovers are picking up whatever tractors they can get—and standing pat on LaPlant-Choate Positive Forced Ejection Scrapers. Why LPC? Because competitive tests prove that under the varying conditions of scraper operation, LaPlant-Choate's improved rigs consistently deliver *highest average production at lowest over-all costs.* Just ask any recent LPC owner. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland, Calif.

FIRST in value because they're **FIRST** in performance

LaPLANT-CHOATE

Positive FORCED EJECTION SCRAPERS

R THAT MAKES THE PROFIT!



CONDON & CUNNINGHAM ran into a dry glacial clay deposit on this hospital expansion job at Council Bluffs, Iowa. However, their new LaPlant-Choate C-114's handled it easily, averaging less than 1¼ minutes per load—without the aid of a pusher. Material was spread smoothly and cleanly in just 20 seconds.

J. TOMEI & SONS—Los Angeles contractors found their LaPlant-Choate C-108 ideally suited for this difficult subdivision job in Sherman Oaks, California. Operating in exceptionally wet heavy "dobe," the C-108 got heaping loads in one minute—spread them cleanly in 16 seconds—averaged 20 to 60% more yardage than competitive scrapers on same job.

HARRIS CLAY COMPANY uses a combination LaPlant-Choate hydraulic dozer and C-108 scraper for stripping overburden from rich Kaolin deposits near Spruce Pine, North Carolina. Soil is heavy clay — full of rocks and roots — but the C-108 loads and spreads it with ease. Outfit is also available for building and maintaining roads on company property.

SANTA CLARA COUNTY, CALIFORNIA, keeps the crusher in their gravel pit operating at full capacity with one LaPlant-Choate C-108 scraper, dumping into a hopper. Smart downhill scraper loading in a well defined trough produces extra big loads of the heavy aggregate, enables the county to operate their own plant at extremely low cost.

This Machine Sure "Gets Around"!

. . . SPEEDY TO THE JOB . . .
POWERFUL AND STEADY ON THE JOB!

T'S THE LINK-BELT SPEEDER WHEEL-MOUNTED UC-55 "SHOVEL CRANE"

You get to the job quickly with a wheel-mounted Link-Belt Speeder UC-55 and when you get there, you get into operation quickly, with plenty of power, and a steady machine that handles a wide variety of operations. One-man operated, it travels at 10 m.p.h. on the highway, negotiates rough ground easily, and has four-wheel drive for heavy going.

Hydraulic stabilizers lock the oscillating front axle, compensating for uneven ground preventing tipping and taking strains off working parts.

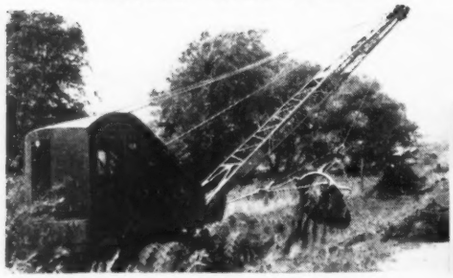
Twin Disc Hydraulic Power take-off lengthens cable life and saves machine from shocks. Like all Link-Belt Speeders, it is quickly converted from shovel to crane, dragline, trench-hoe, pile driver, etc.

You'll go places in a hurry with a Link-Belt Speeder UC-55!

JUST TWO OF THE MANY JOBS YOU CAN DO WITH UC-55

DRIVING PILES ON BRIDGE REPAIRS

DITCHING WITH DRAGLINE



LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

These Ratings Take the GUESSWORK *Out of Buying!*

THERE'S no guesswork in buying meat. Government standards see to that. Just what to expect is disclosed by the gradings "AA," "A," "Commercial" and "Utility." Each cut of meat is stamped with these "ratings."

Similarly, the AGC rating plate takes the guesswork from pump buying. You can tell your pump's performance at a glance. The AGC rating plate is your built-in insurance policy that the pump you buy will deliver the capacity set up for it by the AGC Contractors Pump standards. Look for the AGC rating plate on your next pump. It's there for your protection. It means that, regardless of size, the pump you buy will deliver the amount shown on the plate.

BE SURE you get your copy of this Users' Pump Manual, prepared by the Contractors Pump Bureau. Contact your distributor or write any of the Companies listed below.

CONTRACTORS PUMP BUREAU

(ESTABLISHED 1938)

Affiliated with

THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.

BARNES MANUFACTURING CO.
Mansfield, Ohio

CHAIN BELT COMPANY
Milwaukee, Wis.

JAEGER MACHINE COMPANY
Columbus, Ohio

C. H. & E. MANUFACTURING CO.
Milwaukee, Wis.

CONSTRUCTION MACHINERY CO.
Waterloo, Iowa

MARLOW PUMPS
Ridgewood, N. J.

WORTHINGTON PUMP & MACHINERY CORP.
Holyoke, Mass.

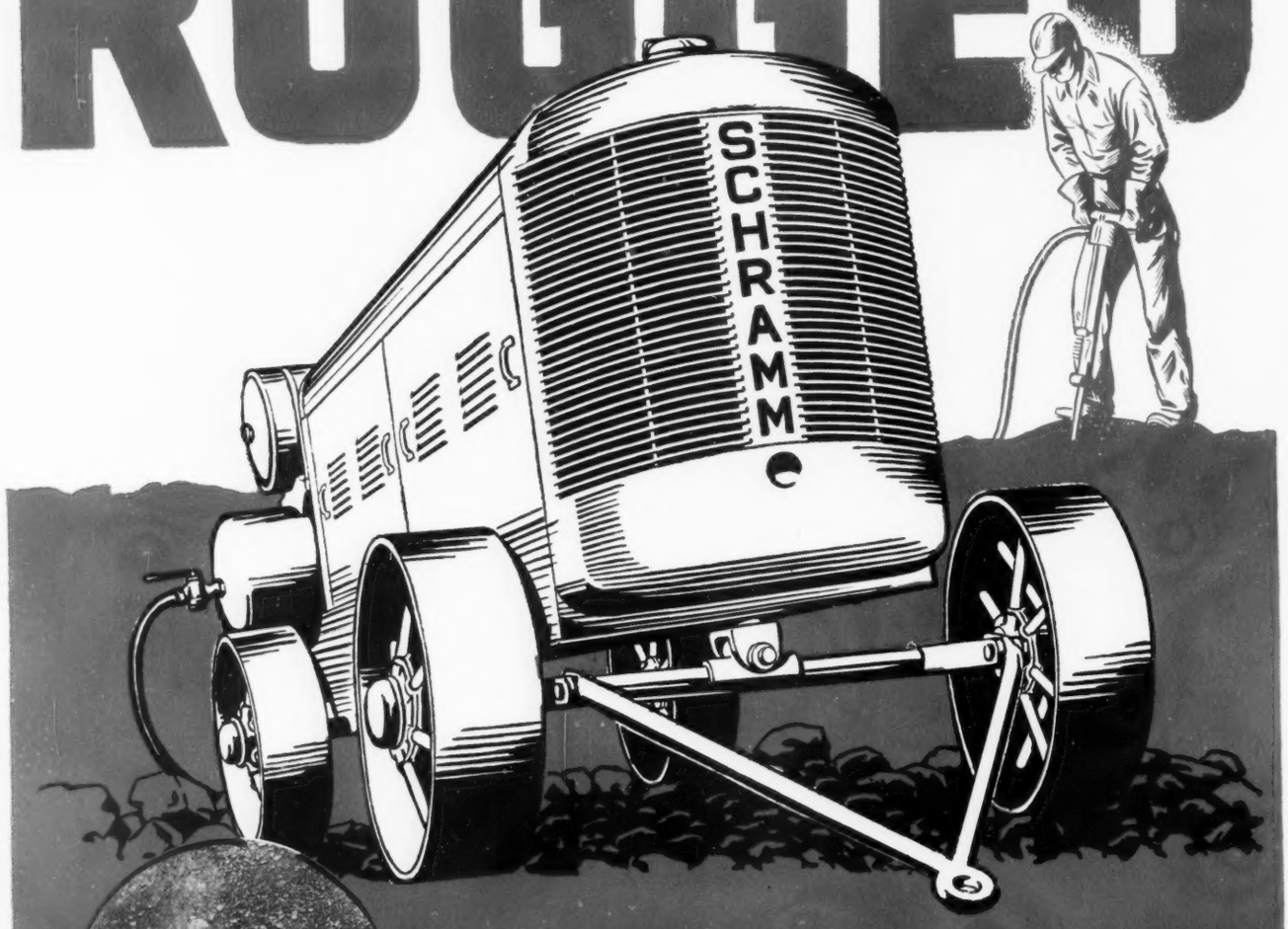
STERLING MACHINERY CORP.
Kansas City, Mo.

CARVER PUMP COMPANY
Muscatine, Iowa

THE GORMAN-RUPP COMPANY
Mansfield, Ohio

NOVO ENGINE CO.
Lansing, Mich.

RUGGED



Of course, they're rugged! Every Schramm Portable Compressor is built to stand up on the toughest quarry jobs year in and year out. 100% water cooling guarantees safe operation in any climate, no matter how warm or how cold. Look at just a few of the other features that assure long, trouble-free operation: (1) Main bearings for every cylinder, (2) mechanical intake valve, (3) more cylinders and lighter parts, and (4) forced-feed lubrication to every moving part.

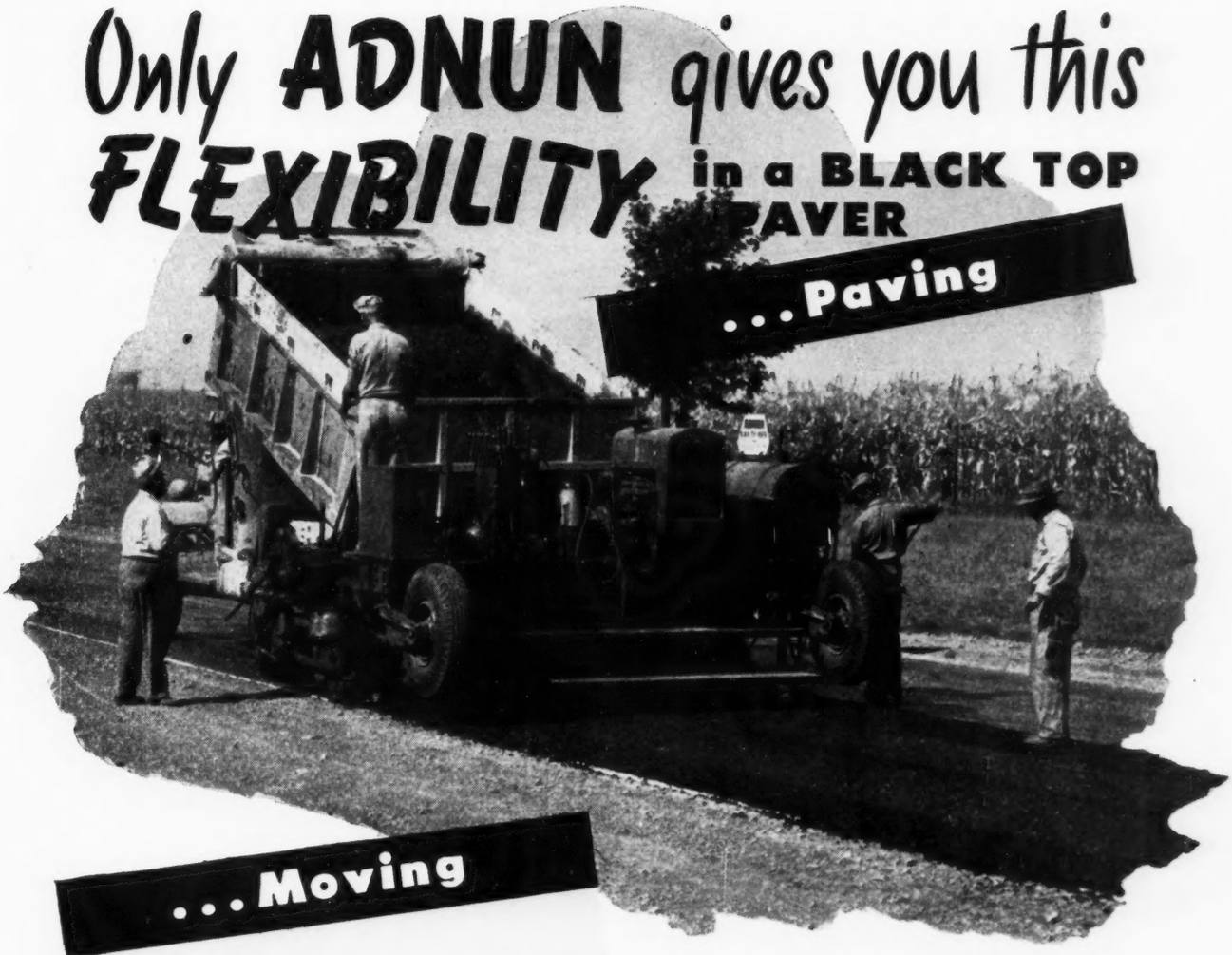
Whatever your compressed-air requirements—for one hand-held drill or wagon drill, or several of them, you'll be way ahead in operation and maintenance costs with a RUGGED Schramm Portable Compressor supplying the power.

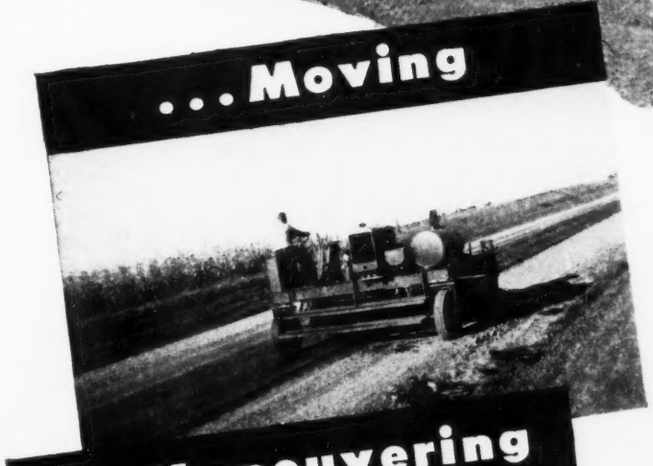
Available in a variety of sizes—on wide-rimmed steel wheels or pneumatics, to fit your needs. For complete details send for Bulletin Q-44.

SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Only ADNUN gives you this FLEXIBILITY in a BLACK TOP PAVER





PAVING . . . Adnun Black Top Pavers continue to make records for fast, low-cost paving on a wide range of jobs. You can lay all of these materials with an Adnun: any type of bituminous paving, hot or cold, stone, slag, sand, gravel or soil cement. And Adnun Continuous Course Correction, hydraulic controls, power-cutoff, and many other exclusive advantages add up to real flexibility that means precision paving on more jobs for more profit.

MOVING . . . Between jobs, and returning the paver to begin a new strip, Adnun retractable wheels save you valuable time and labor . . . Just drop the wheels and roll smoothly over newly-laid pavement—or cobblestones—without damage to machine or road surface. Adnun can be easily towed, or operated under its own power when retractable wheels are down.

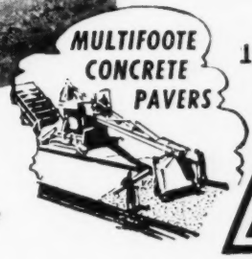
MANEUVERING . . . Turning around, or getting into position to begin paving, an Adnun simplifies the operator's job and permits more time on work that makes the profit: actual paving operation.

Your Adnun Distributor has the whole story on Adnuns . . . Ask him for details, or write us direct.

THE FOOTE CO., INC.

1910 State Street, Nunda, New York

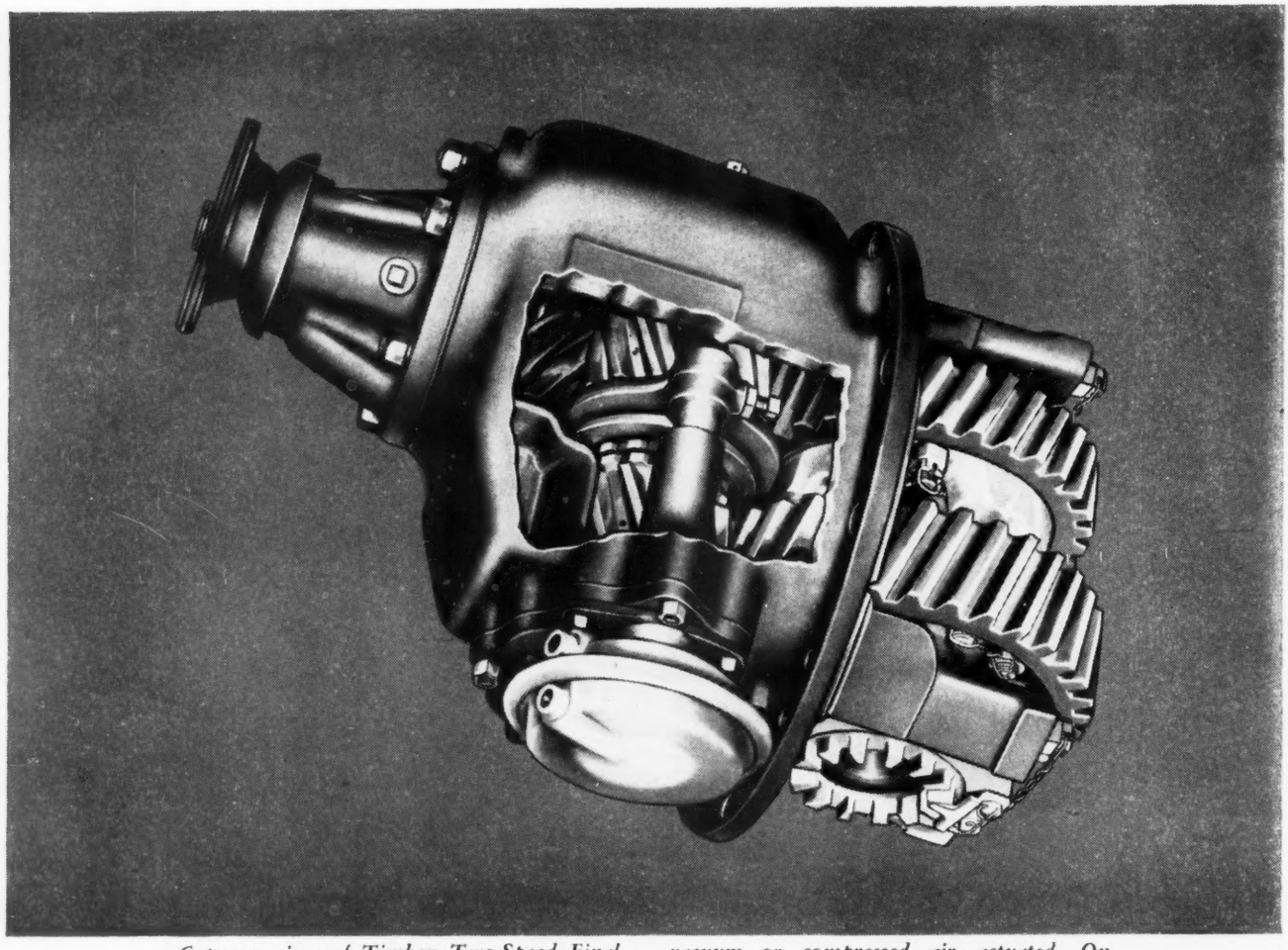
Retractable wheels can be attached to Adnun Pavers already on the job, as well as to new machines. When ordering, please be sure to give serial number of your Adnun.



ADNUN

TRADE MARK REGISTERED

BLACK TOP PAVER



Cutaway view of Timken Two-Speed Final Drive with Easy-POWER Shift. The Timken Easy-POWER Shift unit may be either vacuum or compressed air actuated. On heavy-duty axles, it is front-mounted, operating through a bell crank inside the housing.

Built-In muscles do your shifting!

YOU'RE LOOKING at the Easy-POWER Shift mechanism in a Timken Two-Speed Axle.

Here are mechanical muscles that leap into action at the flick of a finger. A momentary release of the accelerator pedal, and the strong-arm work of shifting axle gears is done for you—instantly, positively!

Sure—this Timken Easy-POWER Shift is big, tough and strong. But best of all, it's *built-in* as an *integral part* of the axle—not simply tacked on to the outside where it would be exposed to water, ice, dust, and flying gravel. What's more, it is lubricated by the gear lubricant—special lubrication is never required.

Only Timken gives you *built-in* power shifting—with no outside connecting rods or linkage to go haywire. Timken's simple, rugged, *built-in* construction pays off in more efficient shifting, lower maintenance costs and longer life.

• • •

Timken Two-Speed Double-Reduction Axles with Easy-POWER Shift make it child's play to split transmission gears and get just the right gear combination to meet any speed, load or road condition—in a split-second. To get *all* the advantages of two-speed final drive for your new vehicles, be sure you specify Timken Two-Speed Axles with Built-in Easy-POWER Shift.

DOUBLES GEAR COMBINATIONS

The Timken Two-Speed Axle supplies the missing rungs in your ladder of truck performance—bridges the big gaps between ratios provided by the "single-speed" axle. You get *8 speeds forward instead of 4, 10 instead of 5, 12 instead of 6,* depending upon the number of transmission speeds.

The Accepted TIMKEN AXLES Standard

TIMKEN AXLES

THE TIMKEN-DETROIT AXLE CO. DETROIT 32, MICH.
WISCONSIN AXLE DIVISION • OSHKOSH, WIS.
TIMKEN AXLE BRAKE DIVISION • DETROIT 32, MICH.

SPEED UP CONSTRUCTION WITH HEAT!

The Herman Nelson Self-Powered Heater cuts winter "waiting-time"

can be used for

SPACE HEATING of temporary buildings, storage sheds, repair shops, buildings under construction.

PREHEATING engines and all kinds of mechanical equipment.

SPOT HEATING of materials, workmen, machinery, storage tanks, tools.

THAWING frozen areas and machinery, wheels, gears, transmissions, caterpillars, etc.

VENTILATING and heating of manholes, tunnels, box cars, ship holds, confined areas of all kinds.

DRYING and curing of materials, plaster, paint, mortar, concrete, etc.

Now, for the first time, you can have an independent source of QUICK HEAT—LOTS OF IT, to carry you through many a winter emergency. No more cold weather delays. No more wasting of time. This amazing new heater turns out volumes of fresh, heated air within minutes—enough to heat three ordinary five room houses! Burns gasoline by an entirely different and safe method. No soot. No smoke. No open fires. Simply designed and easily operated. Requires a minimum of attention. The Herman Nelson Self-Powered Heater is a completely self-contained, portable unit—utterly new in principle. Can be easily moved from place to place on the job—by one man.

herman nelson moline illinois

THE HERMAN NELSON CORPORATION

for 40 years manufacturers of quality heating and ventilating products

MOLINE, ILLINOIS

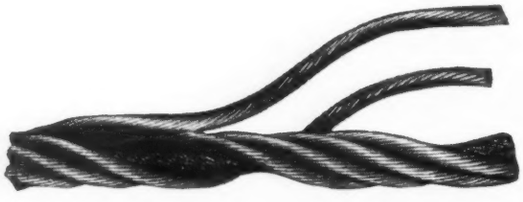
Where does Form-Set Rope (PREFORMED) do a better job?

A good question—one we're often asked. Generally speaking, it does a better job wherever operating ropes pass around small sheaves and wind on small drums. Or where reverse bends are necessary. Or in other situations where added flexibility is a definite asset.

All grades, sizes, and types of Bethlehem wire rope can be furnished with the Form-Set (preformed) construction. We recommend preformed rope whenever extra performance thoroughly justifies its installation.

By extra performance we mean less kinking, better spooling, better reeving, and greater resistance to bending fatigue. The latter is especially important where running ropes must bend sharply, for preformed rope is free of pent-up internal stresses. It is "relaxed"; it does not fight itself to death.

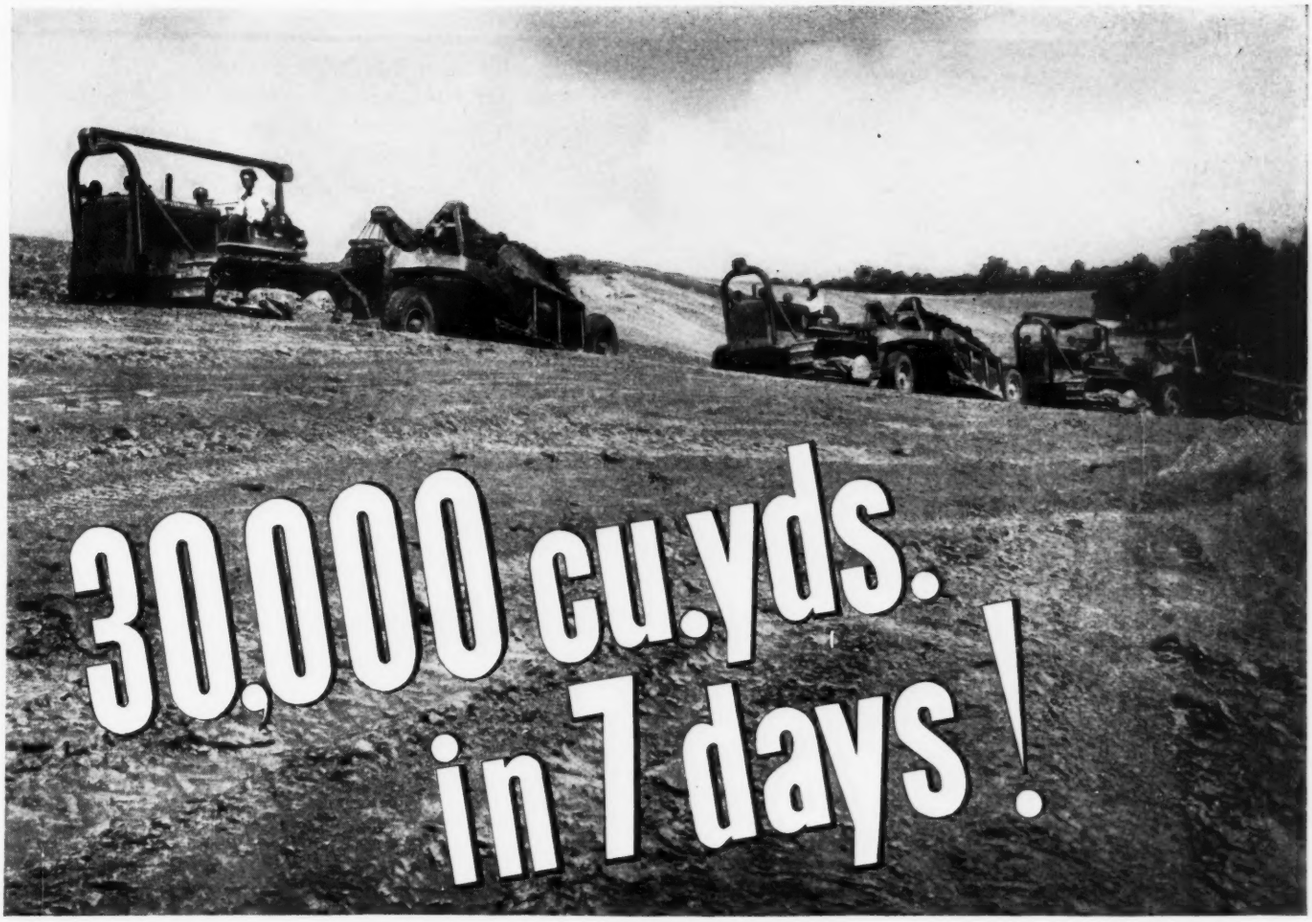
Form-Set rope is as easily handled as a gentle, friendly dog. Yet it's tough, too—and it l-a-s-t-s.



Section of Form-Set (preformed) rope. The displaced strands shown here have been lifted out by hand; they cannot pop loose by themselves, even when cut or broken

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

When you think WIRE ROPE . . . think BETHLEHEM



. . . the fast, bonus loading—the fast, clean dumping — the dependability of 3 HEIL Cable Scrapers save time and money on Mississippi River levee job!

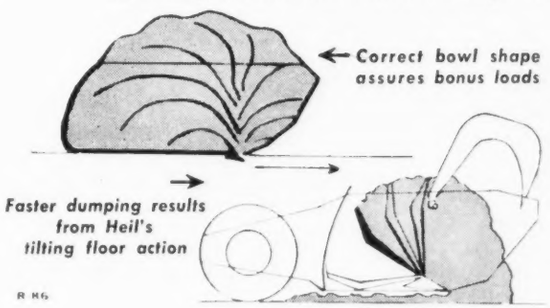
Heil Cable Scrapers have a reputation for moving more dirt, faster and at lower cost. They earned this reputation the hard way, on just such jobs as this Mississippi River levee. Only three Heil Cable Scrapers were required — two eight- and one ten-cu. yd. units — to move 30,000 yds. of heavy gumbo in one week's time. This is earth-moving at its best — made possible by the following Heil features:

Greater digging ability — Heil Cable Scrapers load in a shorter distance because they dig harder. The draft pivot point is located in such a way that the weight of the scraper is placed on the cutting bit for better penetration.

Bonus loads, no voids or waste — the shape of the bowl and front gate of Heil Cable Scrapers conforms to the boiling action of the dirt as it is dug. There are no empty pockets to fill, so the scraper loads to capacity quickly — no material is thrown over the back of the bowl; no wasted effort or lost time.

Faster, cleaner dumping — the high-opening front apron permits a third of the load to roll out by gravity. The remainder is ejected by means of a tilting floor. Both the sides and rear of the bowl are scraped clean during this tilting operation. The efficient Heil dumping action requires little line pull — loads can be dumped at hauling speeds — no time is lost in shifting gears.

Prepare for the busy days and the tough competition ahead. Use time- and money-saving Heil Cable Scrapers to do your earthmoving — they are available in all the standard sizes. See your International Industrial Power distributor for all the facts. Write for latest bulletins.



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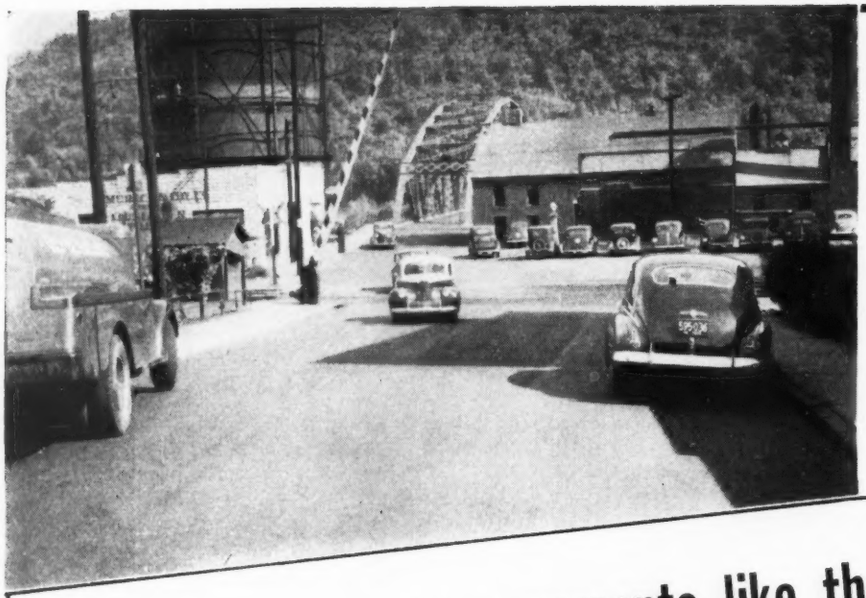
THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN



A dense-graded Texaco Asphaltic Concrete pavement, consisting of a 1½-inch binder course and 1-inch wearing surface, laid over worn brick in Greenfield, Mass.

America has laid pavements like these for 40 years

A Texaco Sand Asphalt pavement constructed five years ago over worn concrete on State Highway No. 17 in Norfolk County, Va.

Resilient Texaco Asphalt pavements like those pictured here will absorb punishing impact for years with minimum maintenance. Road builders throughout the country tell the same story, based on 40 years of experience with Texaco performance.

All Texaco Asphalt products are refined only from carefully selected crudes. They meet the most exacting Federal, State and City specifications.

Whether your road, street or airport project calls for an Asphalt Cement, a Cutback Asphalt or a slow-curing Asphaltic Oil, there is a Texaco product which has been refined to meet your requirements. The strategic location of Texaco refineries is your assurance of prompt, dependable service. Whenever you need their assistance, Texaco Engineers who are Asphalt specialists are at your service. Write our nearest office.

THE TEXAS COMPANY, Asphalt Sales Dept., 135 E. 42nd Street, New York City 17

Boston 16 Chicago 4 Denver 1 Houston 1 Jacksonville 2 Philadelphia 2 Richmond 19

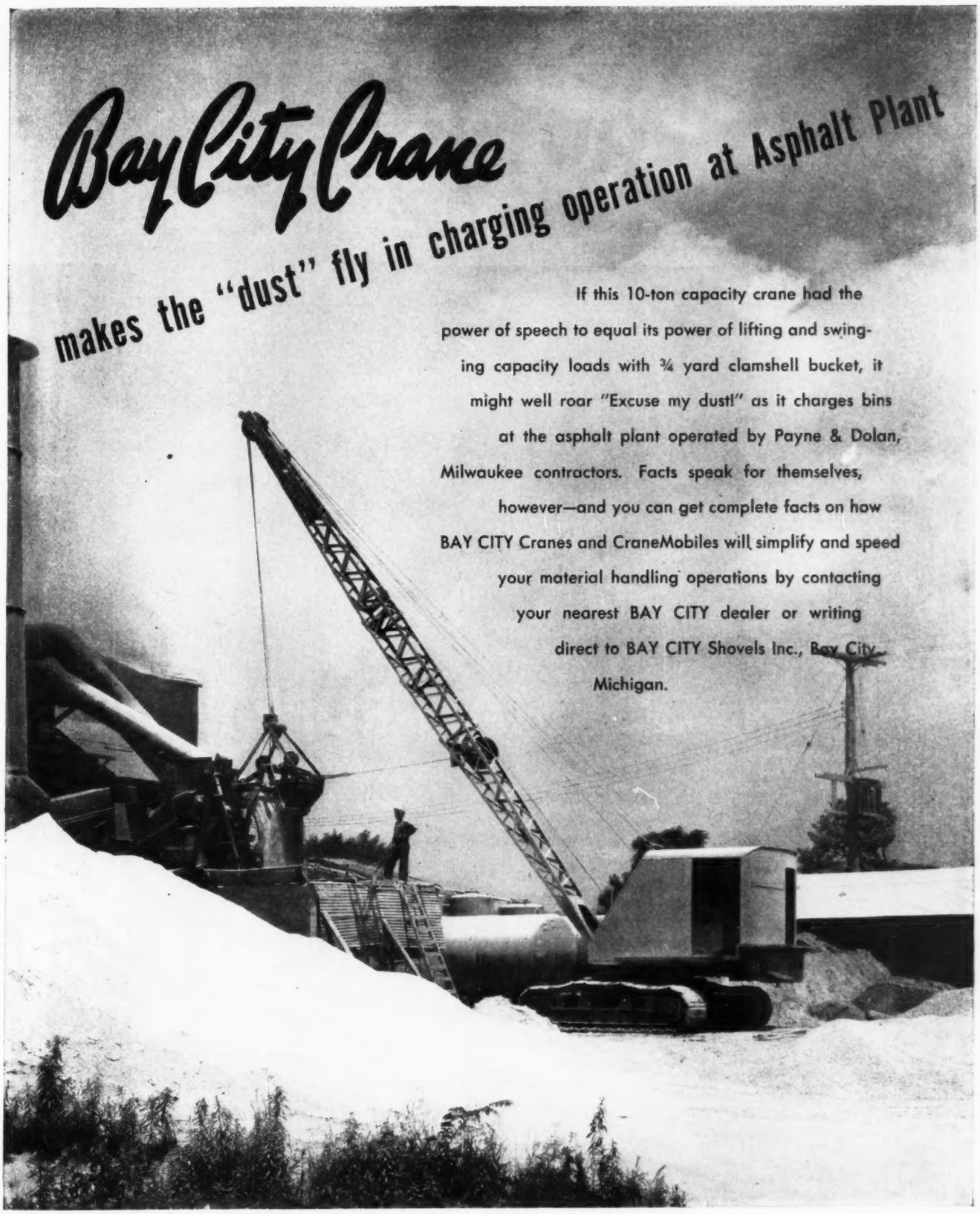
TEXACO

REG. T.M.

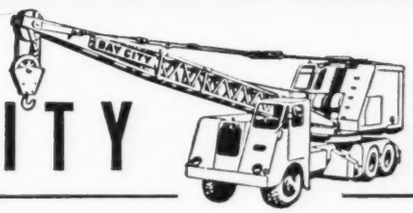
TEXACO ASPHALT

Bay City Crane

makes the "dust" fly in charging operation at Asphalt Plant



If this 10-ton capacity crane had the power of speech to equal its power of lifting and swinging capacity loads with ¾ yard clamshell bucket, it might well roar "Excuse my dust!" as it charges bins at the asphalt plant operated by Payne & Dolan, Milwaukee contractors. Facts speak for themselves, however—and you can get complete facts on how BAY CITY Cranes and CraneMobiles will simplify and speed your material handling operations by contacting your nearest BAY CITY dealer or writing direct to BAY CITY Shovels Inc., Bay City, Michigan.

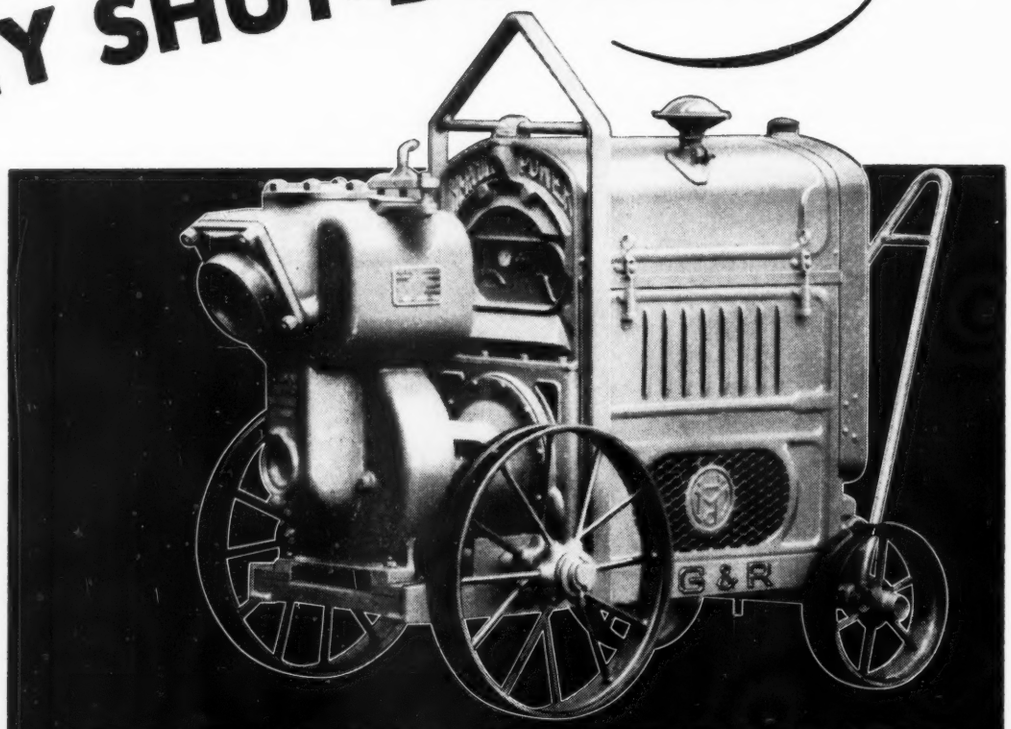


BAY CITY

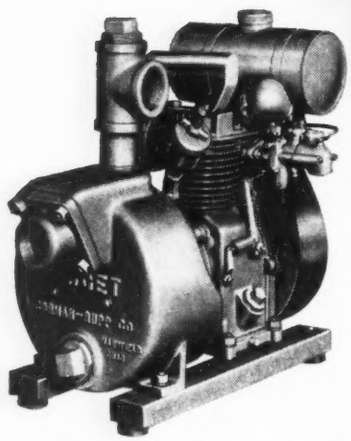
SHOVELS • DRAGLINES
CRANES • HOES • CLAMSHELLS

SEE YOUR NEAREST DEALER for Bay City excavating and material handling equipment in sizes from ⅜ to 1¼ yards having crane rating up to 20 tons. Both crawler and pneumatic tire mounting.

Eliminate COSTLY SHUT-DOWNS



GORMAN-RUPP PUMPS *Stay "On-the-Job"*



Gorman-Rupp Lightweight Pumps are exceedingly valuable for all kinds of odd jobs where heavy pumps are not necessary or are impracticable. The "Midget" pictured here, the smallest of the lightweights, weighs only 60 lbs. and will pump 3000 G. P. H. at ordinary heads.

Three months continuous runs without shut-downs are common occurrence with Gorman-Rupp self-priming centrifugal pumps. Five years without repair are frequently reported.

The reason for such performance is built into all Gorman-Rupp pumps. It's the simplicity and good design; the streamlined inside construction with no traps or obstructions to stop the free flow of water -- muck and solids will not clog the pump; the greater priming simplicity pays off in more work for less fuel and power. All these and other features make Gorman-Rupp centrifugal pumps the most efficient and trouble free pumps you can buy. They will out-perform and out-live any other comparable equipment.

Write for further information.

THE GORMAN-RUPP COMPANY

308 BOWMAN AVE. • MANSFIELD, OHIO

CONTRACTORS:
save money with trucks that fit your job!

● In buying new equipment, it will pay you to consider *carefully* a truck that will *fit your job.*

With a *"Job-Rated"* truck—you get time-proven *economy* and dependable *performance*—day after day, year after year!

And naturally, *"Job-Rated"* trucks *last longer!*

Yes . . . when you buy a *"Job-Rated"* truck, you have the assurance that every unit—such as engine, clutch, transmission, and brakes—will be engineered and built for "top" performance and maximum economy —with *your* loads, over *your* roads!

With its wide range of 175 *"Job-Rated"* chassis models—Dodge can best fit *your* job—save *you* money!

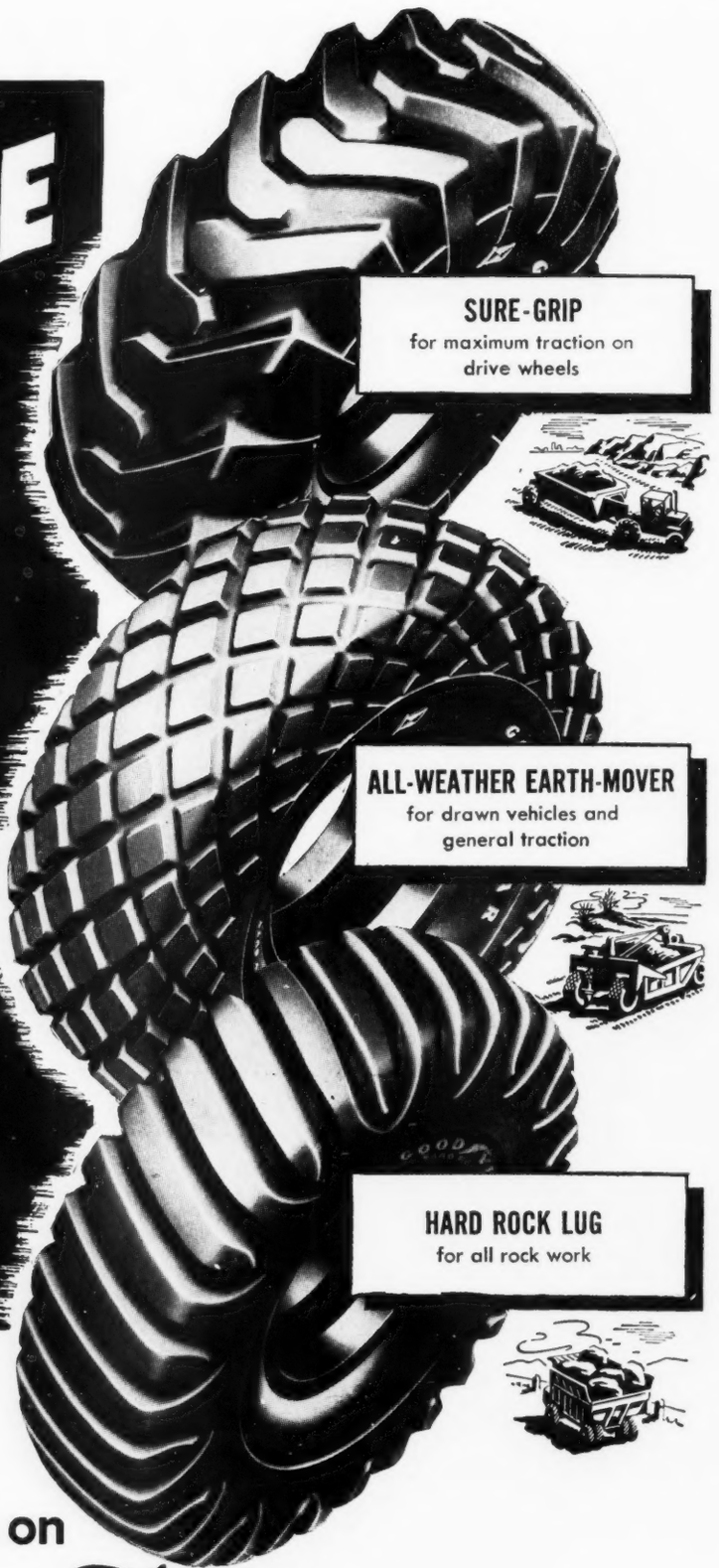
Ask any Dodge owner how well he's satisfied with the economy, performance and long life of *his* Dodge *"Job-Rated"* truck—and you'll need no further urging to see your Dodge dealer about a *"Job-Rated"* truck to fit *your* job!

Only DODGE builds "Job-Rated" trucks

DODGE "Job-Rated" TRUCKS FIT THE JOB ! LAST LONGER !

BACKBONE of the BIG JOBS

IS THE LOW-COST HIGH-HOUR PERFORMANCE OF THESE TIRES



SURE-GRIP
for maximum traction on drive wheels

ALL-WEATHER EARTH-MOVER
for drawn vehicles and general traction

HARD ROCK LUG
for all rock work

That's why
more yards are moved on

GOODYEAR

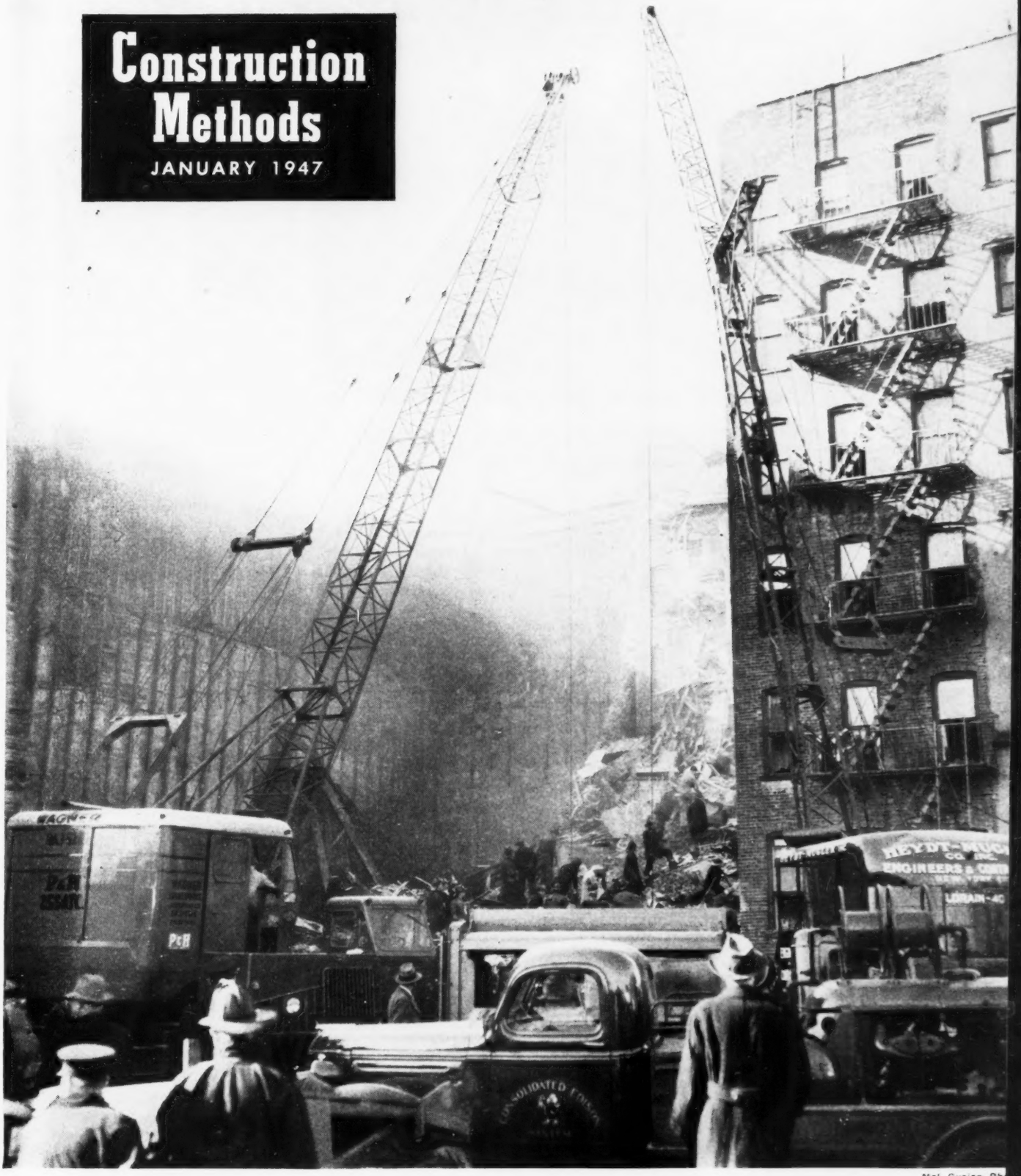
OFF-THE-ROAD TIRES
than on any other kind

BUY and SPECIFY GOODYEAR —it pays!

Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company

Construction Methods

JANUARY 1947



Mal Gurian Ph

CONSTRUCTION EQUIPMENT ON ERRAND OF MERCY

DIVERTED MOMENTARILY from prosaic construction tasks, two cranes for three days and nights probed gently into the debris of a collapsed 6-story tenement in upper Manhattan, New York City, where scores of persons were buried alive. The tragedy, resulting in 37 deaths, was caused by failure of a high brick wall of an adjoining icehouse damaged by fire early Dec. 12. Heydt-Mugler Co., Inc., New York contractors called to the scene an hour after the accident to take charge of debris removal and emergency shoring, put Lorain and P&H cranes on the job. Extreme care was necessary in operating the cranes to prevent further movement of the piles of rubble and household effects that might endanger trapped persons. At first muck buckets were loaded with debris by hand, but clamshells were later used to speed rescue work and recovery of bodies.

Special Rigging Handles

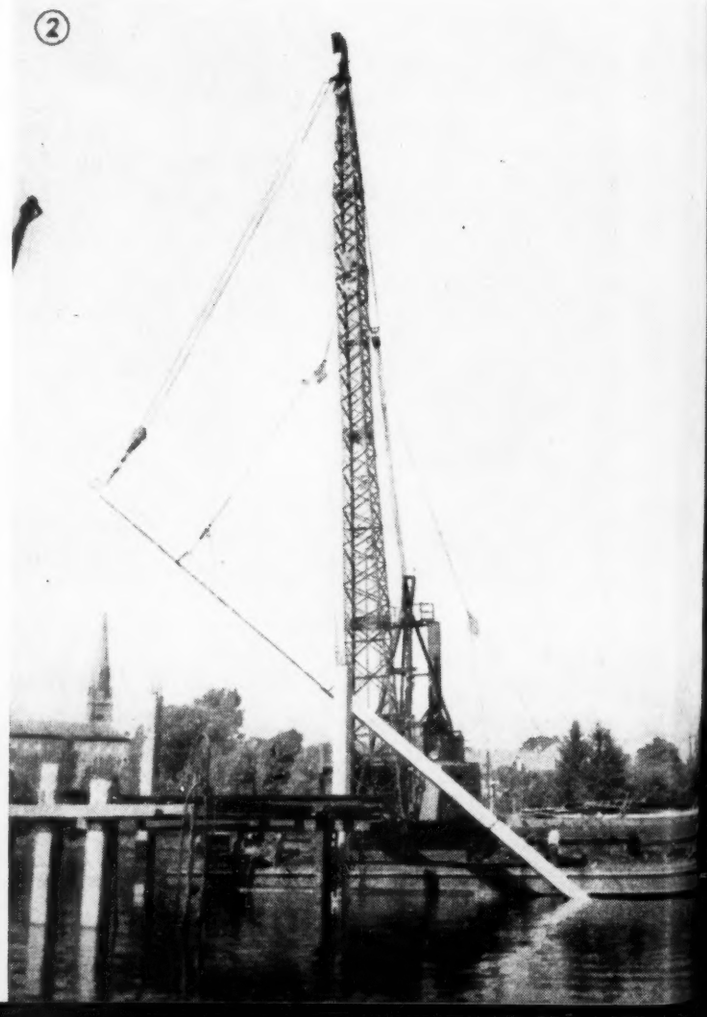
STRONGBACK for handling green concrete piles consists of 73-lb. 14-in. H-beam carrying four adjustable hooked clamps that can be shifted to quarter-points of various length piles. Four-point cable pickup is fastened to top flange of beam.

SPECIAL PROCEDURE was developed by McLean Contracting Co., Baltimore, to make, handle and drive 24x24-in. concrete piles up to 117 ft. long for the new highway bridge across Spa Creek between Annapolis and Eastport, Md. The longer piles, weighing 36 tons each, are among the largest precast piles ever driven.

Except for two piers, also founded on concrete piles and carrying a double bascule span, the bridge is a simple concrete pile and steel beam trestle with a concrete deck. Most of the bents are six-pile, but in each approach there is one eight-pile bent with four piles driven on a batter for longitudinal stability.

Key to the piledriving operations is McLean's floating Wiley Whirley Model 124 steam crane, equipped

FREE-RUNNING BRIDLES (below) lift piles to position for driving. Four of five pick-up lines, consisting of two sets of free-running bridles hooked up to third set, are handled by one load line from Wiley Whirley floating crane. Fifth pick-up is second load line fastened to top of pile. (1) Simultaneous strains on both load lines gives even lift at five pick-up points to raise pile in horizontal position from barge. (2) Added pull on top-end load line cants pile into inclined position while equally-distributed support still holds on bridle pick-ups. (3) As pile approaches vertical position, load is slacked off on bridles and taken by top load line. Crane's 125-ft. boom is long enough to swing 117-ft. pile into driving position inside of



les 117-Ft. Concrete Piles

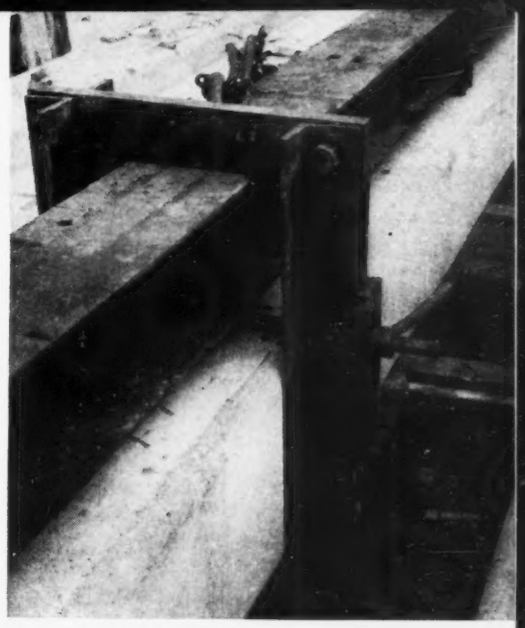
with a 125-ft. boom and mounted on a steel barge. As this is the only rig, land or floating, available for this job that is capable of handling the heavy piles, construction procedure had to be developed around its use. The four drums on the crane engine are utilized as follows: one on the boom line, two on load lines, and one on a jet line.

The piles, all 24 in. square, run from 37 to 117 ft. long. A casting yard was set up along a bulkhead on the Eastport shore to manufacture lengths up to 80 ft. Because the weight of piles longer than 80 ft. is beyond the capacity of the crane at low-boom position necessary to reach the casting yard, all piles from 81 to 117 ft. long are cast on barges anchored at the bulkhead. All concrete is delivered to the job in transit mixers and that for the piles is placed by crane-handled bucket. Bents are driven from each shore toward the lift span. As piles for bents are completed, the concrete caps are poured by a Pumpcrete machine pumping through a line carried on temporary beams between the bents. Concrete for the piers is delivered in the same manner.

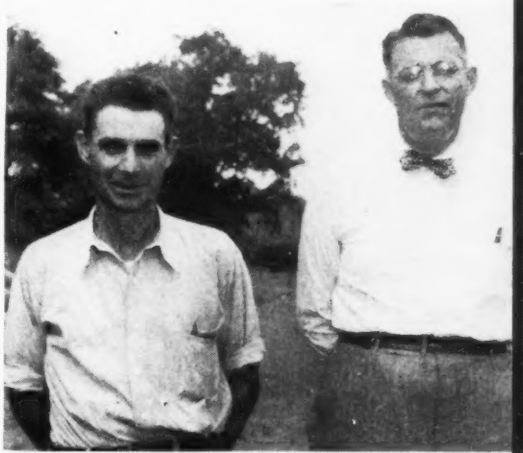
Strongback Lifts Piles

A 73-lb. 14-in. H-beam has been rigged up as a strongback with four adjustable clamps for lifting the piles from the forms to storage while they are still green enough to require rigid support. The clamps, shown in detail in an accompanying illustration, can be shifted along the beam to the quarter-points of the various length piles. Cable pickup from the derrick to strongback is also at four points through two free-running bridles which, in turn, are hooked to a third free-running bridle handled by one of the crane load lines.

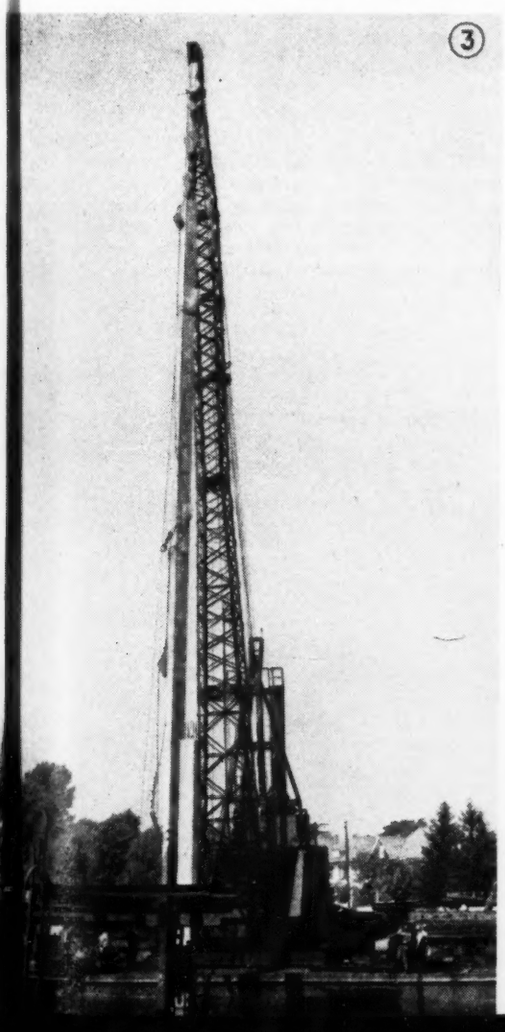
When lifting the piles into driving position, the strongback is dispensed with and the four bridle pickups are attached directly to the pile at quarter-points. The second crane load line is fastened to the top of the pile. The pile is lifted first in horizontal position, then a strain on the top line cants the pile to vertical position as the bridle line is slacked off. Because of the free-running bridles, the pile is partly supported at the quarter-



SLIDING CLAMP for connection between strongback and pile is heavy bar carrying double pair of angles hooked at bottom to engage pile, clamped tight by toggle bolt between beam and pile. Clamps can be shifted quickly to quarter-points of pile for correct weight distribution for lifting.

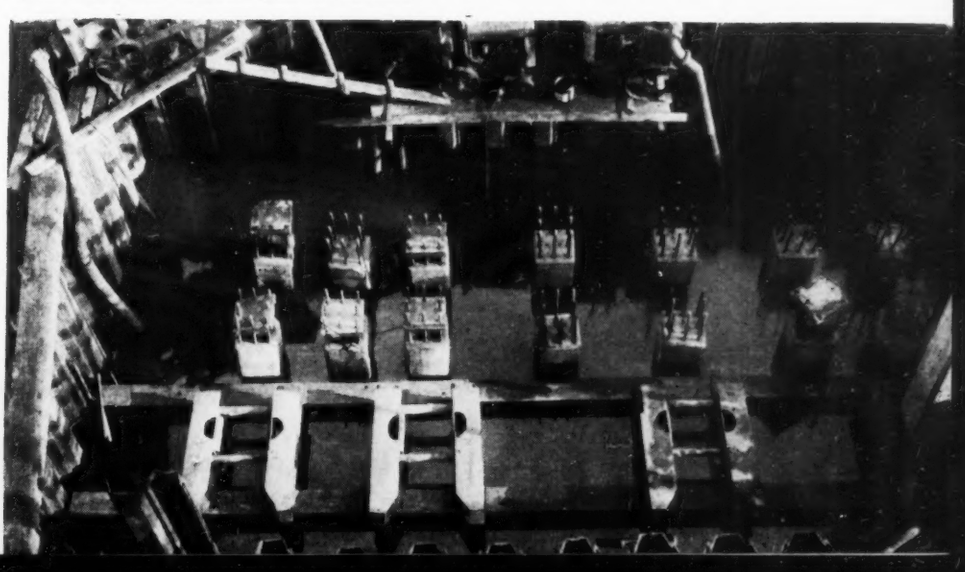


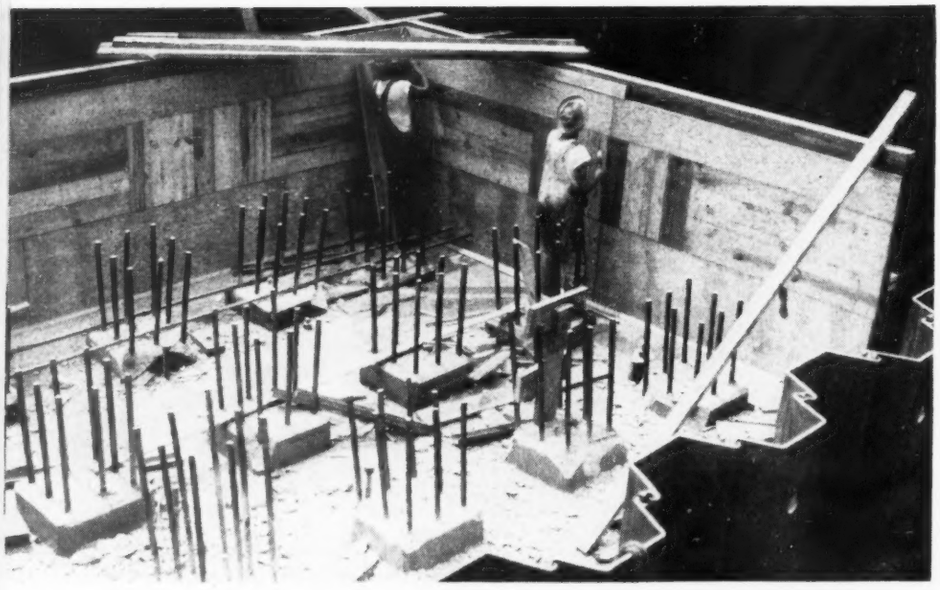
TEAMED UP to build Spa Creek bridge are **W. A. JORDAN** (left), resident engineer in charge for Maryland State Roads Commission and **EDWARD P. COBLENTZ**, project manager for contractor, McLean Contracting Co.



template. Pile drops most of way through 80-ft. mud bottom by own weight then is jetted well into hard formation and is finally seated by driving with No. 0 Vulcan hammer without leads. Piles are held and guided by steel templates.

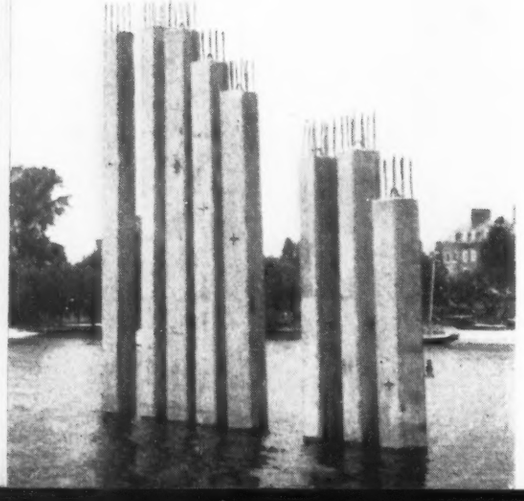
STEEL TEMPLATE (below) with adjustable pockets all carried on H-beam temporary piles, serves as guide for driving concrete piles without leads. Here template is set up in one of two bascule pier cofferdams.





FANCY TREATMENT of bascule pier exteriors is provided by combination of wall form materials. Bands of plywood alternate with vertical and horizontal boards in designed pattern. Piers are built within steel sheetpile cofferdams.

THESE FELLOWS, directly responsible for construction operations at Spa Creek bridge, are proud of pile-handling procedure developed on job. They are W. R. AYCOCK (left), superintendent for McLean; and W. A. EDWARDS, engineer for contractor.



STUCK IN MUD for curing and storage is group of long concrete piles (below). Lack of storage space on barges, where piles were cast, made this novel procedure necessary, while deep mud bottom made it possible.

points at all times through the shift from horizontal to vertical.

Following their usual custom, McLean does not use leads in driving the piles, but prefers a template consisting of a steel horizontal frame, carried by temporary steel H-beam piles, with adjustable pocket guides. The template serves a complete bent or one row of piles in a pier without resetting except for shifting the pockets.

Deep Mud Bottom

At points where the longest piles are required, the water is about 15 ft. deep, underlain with 80 ft. of soft mud. Below the mud is a 10-ft. layer of cemented shells and sand, giving way to sand of undetermined depth. Specifications require at least 15 ft. of penetration below mud bottom.

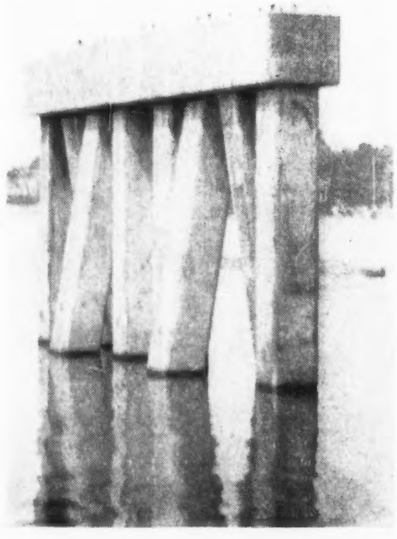
When the piles are dropped through the template pockets they sink almost to the bottom of the mud and are thus well supported for final driving. They are then worked well down into the hard formation by a high-power jet, fed by several pumps connected in series to deliver a maximum of 1,000 gpm at 300-lb. pressure through 1¼-in. nozzles. The jet pipe is 4 in. to reduce friction losses. Final seating of the pile in place is by a No. 0 Vulcan steam hammer swung from the crane load line and powered by the crane's steam boiler. Putting the hammer on the pile makes sure it takes up in solid ground and meets bearing specifications.

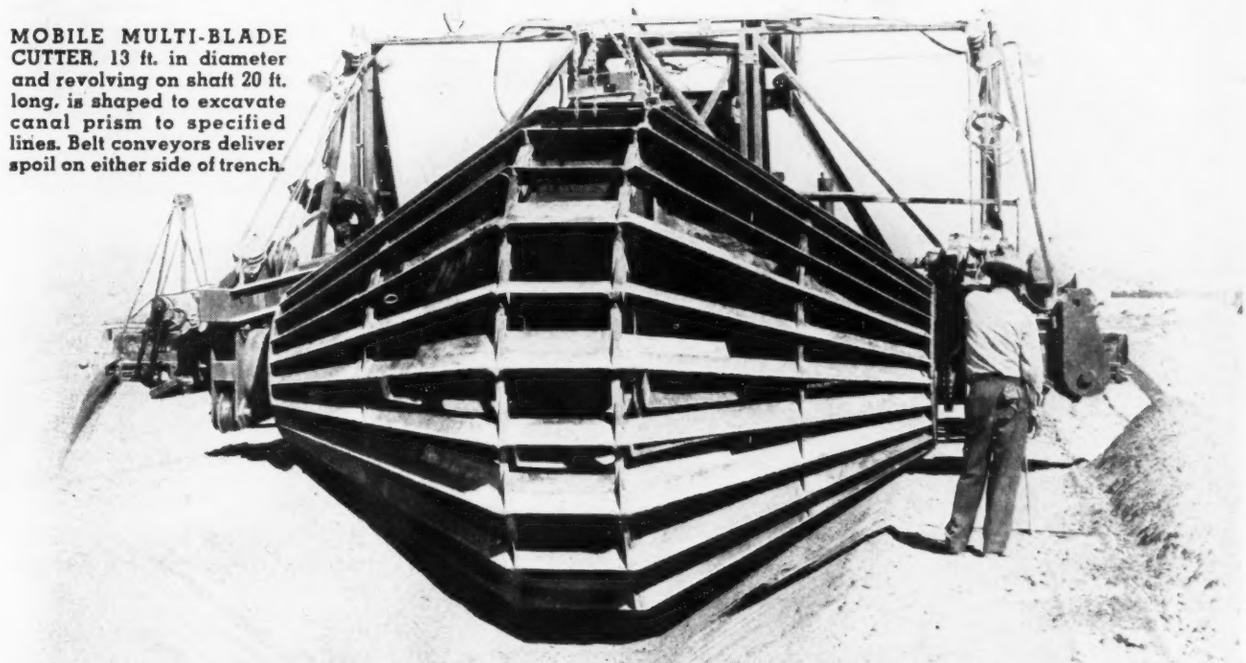
Test Piles 125 Ft. Long

The maximum 117-ft. length of pile was determined by casting and driving several 125-ft. 24x24-in. concrete test piles which weighed nearly 40 tons. Because of limited barge capacity for storage, some of the long piles after casting were dropped vertically in the mud, out of the way of all operations, for curing and storage.

The bridge, replacing a rambling old structure rapidly approaching the state of collapse, is being built by the State Roads Commission of Maryland, for which Wilson Ballard is chief engineer and Walter C. Hopkins is bridge engineer. W. A. Jordan is resident engineer for the state. For McLean Contracting Co. Edward P. Coblentz is project manager and W. R. Aycock is superintendent.

MOST BENTS are six piles each, but in each approach is one 8-pile bent (below) with four battered piles for longitudinal stability. Batter piles are also driven without leads, as steel template and deep mud holds piles in desired position.





MOBILE MULTI-BLADE CUTTER, 13 ft. in diameter and revolving on shaft 20 ft. long, is shaped to excavate canal prism to specified lines. Belt conveyors deliver spoil on either side of trench.

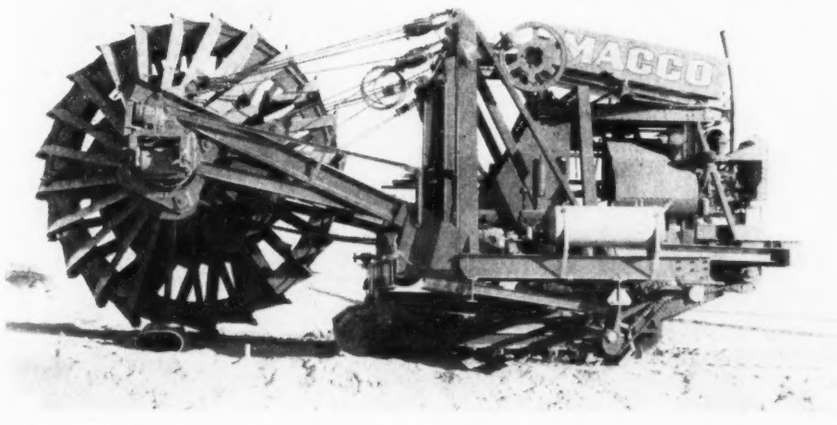
JOB-MADE CUTTER

Digs and Trims Canal for Gunite Lining

By T. A. CLARK, Construction Engineer,

U. S. Bureau of Reclamation, Yuma, Ariz.

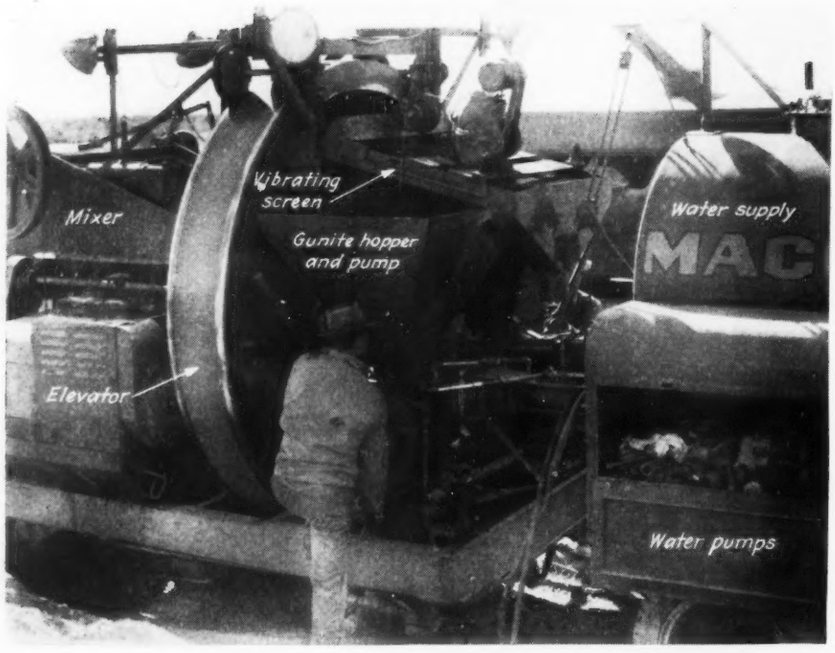
In the article and illustrations herewith, Mr. Clark presents a more complete picture of the methods and equipment on this unusual canal excavating and lining project than was given in a brief description of the same project in the April, 1946 issue of "CONSTRUCTION METHODS."—Editor



SIDE VIEW shows how big cutter wheel is mounted on crawler carriage powered by 175-hp. gasoline engine. Maximum traveling speed is 54 in. per min.

FOR EXCAVATING AND TRIMMING 8 mi. of irrigation canals on the Gila Project of the U.S. Bureau of Reclamation in Arizona, the Macco Construction Co., of Clearwater, Calif., designed and built in its own shops a huge traveling, multiblade cutting wheel, 13 ft. in diameter, revolving on a shaft 20 ft. long and shaped to the exact cross-section of the canal prism. The contract provided also for the application by cement gun to the sloping sides and the bottom of the canals of a 1½-in. thick cement-sand mortar lining reinforced with wire mesh. The following notes cover the main features of the methods and the equipment used:

Requirements—To reshape with compacted earthwork and line with reinforced Gunite approximately 8 mi. of laterals now in constant use for irrigation purposes. The water to be shut off for four days and then run for four days. Canal sections to be of two bottom widths,



FOR LINING CANAL with mortar applied by cement gun, equipment comprises two-gun assembly mounted on four-wheel trailer. Vibrating screen above hopper was later replaced by shaker-type screen.

2.5 ft. and 3.2 ft., side slopes 1½:1 and depth to vary from 2 to 4.25 ft. Work started on Dec. 4, 1945; work was completed May 28, 1946.

Construction Operations — The contractor elected to fill the canal completely with compacted material and then excavate and trim the section in one operation using a machine designed and built in his own shop for this purpose.

Reinforcing for the canal lining was 6x6-in. mesh, 12-gage wire laid in 50-ft. lengths parallel to the canal. All longitudinal joints were lapped 6 in. and transverse joints were butted.

The Gunite lining was placed 1½ in. thick, using two nozzles fed by two cement guns mounted together as a portable unit fed by a single concrete mixer. Air was furnished by two 500-cu. ft. compressors, one to each gun. The mix was 1 part by weight of cement to 4 parts by weight of dry sand. The sand was weighed in wheelbarrows over a standard platform scale. The rebound was not swept off, but the rough surface was given a once-over steel troweling, sufficient to compact and smooth the surface so that white-pigmented curing compound sprayed on at the rate of 150 sq. ft. per gal. gave an adequate seal. Weakened plane grooves were cut transversely in the lining on 6-ft. centers. The grooves were then sealed with a cold-applied, internal setup mastic filler. Expansion joints were placed on 300-ft. centers.

The sequence of operations was as follows:

(1) Compact the banks in 6-in. layers.

(2) Grade off top of bank with motor patrol to insure uniform grade for the excavating and trimming machine to operate on.

(3) Excavate and trim the canal section.

(4) Place reinforcing mesh.

(5) Place Gunite lining, holding the mesh in center of 1½-in. thickness.

(6) Trowel rebound surface and make grooves on 6-ft. centers.

(7) Fill grooves with mastic-type sealing compound.

(8) Spray surface of lining with white-pigmented curing compound.

(9) Trim earth banks of canal covering the top edges of lining with earth.

Special Equipment Used

The excavating and trimming machine, called the "Gimmick," illustrated in the accompanying photos, is powered by a 175-hp. gasoline engine, has five gear cases that produce a 3,000 to 1 reduction. Maximum traveling speed is 54 in. per min. Each of two conveyor belts for disposing of excavated earth at the sides of the cut is

AFTER GUNITE LINING is placed, nozzlemen apply mastic filler to joints with air-pressure guns.

driven by a 3-hp. electric motor. A 10-hp. generating plant mounted on the right side of machine handles this load plus the lights. The cutting wheel is about 13 ft. in diameter with shaft about 20 ft. long. The average performance during the job was as follows:

Length of ditch completed per hr. .....115 ft.
Surface area trimmed per hr. .....156 sq. yd.
Excavated material per hr. .....72 cu. yd.

The line and grade maintained by this machine can stand improvement. The result depends on the skill of the operator and the type of indicator used. The subgrade prepared by this machine is excellent.

Lining Equipment—The portable Gunite unit was assembled by the contractor. Two size N-2 cement guns are mounted side by side on a four-wheeled trailer. A 14-S concrete mixer mounted on the rear of trailer mixes the dry material. A drum-type elevator conveys the material from mixer to the hoppers above the cement gun. A 500-gal. water tank on the front end of trailer supplies water to each nozzle. An air-operated injector water pump supplies the water pressure. One 500-cu. ft. air compressor is connected direct to each cement gun. The truck-mounted compressor unit transports the Gunite trailer.

The average operation of the Gunite equipment was as follows:

Length of canal completed .....52.1 ft. per nozzle-hour.
Surface coverage ..633 sq. ft. per nozzle-hour.

The portable compressor and guns for placing mastic joint sealing compound were very successful and no trouble was experienced keeping up with the Gunite placing operation. Care was required to keep from damaging fresh cement-sand lining as this operation was completed within about 45 min. of the placing.

Final quantities of completed work are as follows:

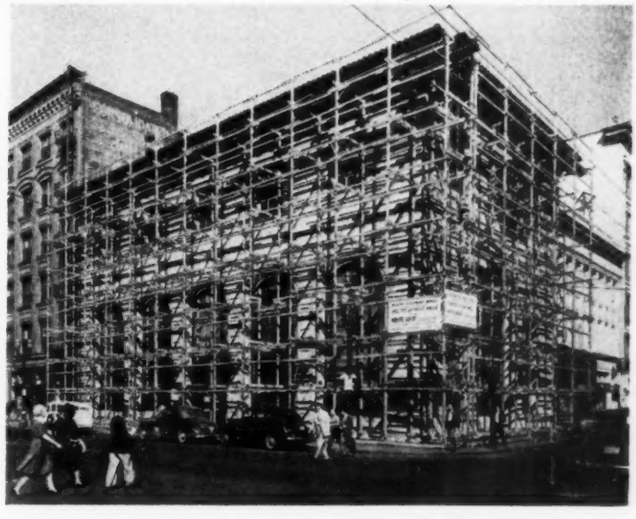
Item	*Work or Material*	*Final Quantity*
1.	Excavation for canals	36,340 cu. yd.
2.	Compacting embankments	12,333 cu. yd.
3.	Trimming foundations for mortar lining	64,296 sq. yd.
4.	Pneumatically applied mortar	62,647 sq. yd.
5.	Placing reinforcement fabric	75,193 lb.

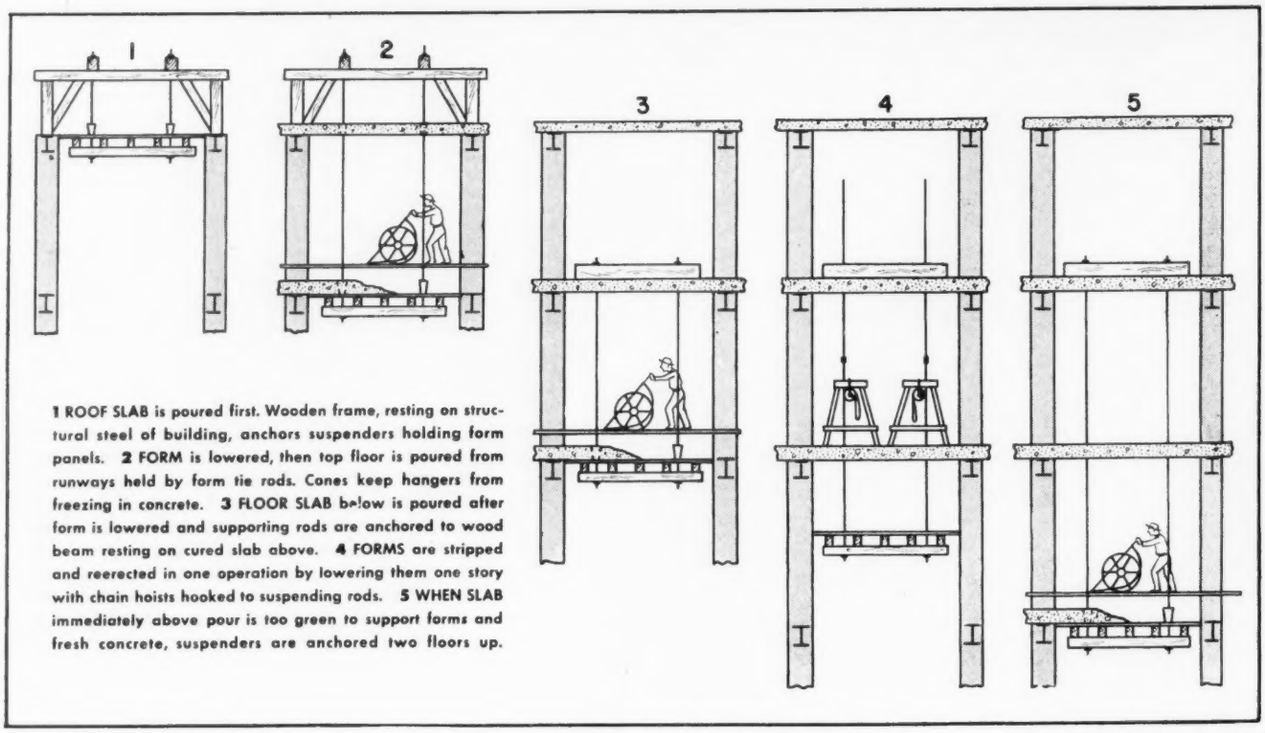
SMALL PORTABLE COMPRESSOR supplies air to guns placing mastic joint filler in canal lining.

JOINTS IN MORTAR LINING, spaced 6 ft. apart, are sealed with mastic filler applied by air-pressure gun.

No Nails at All

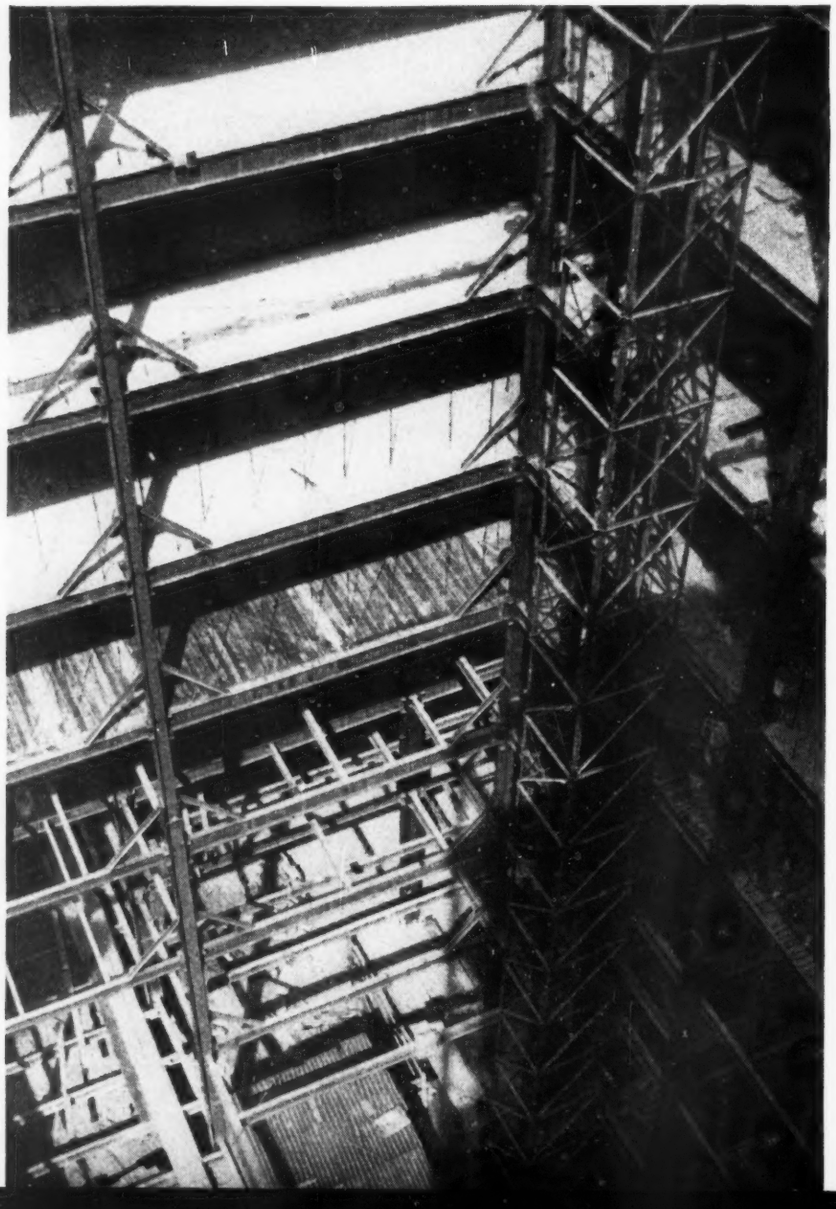
SHORTAGE OF NAILS didn't bother Hord & Stuart, Portland, Ore., contractors, when they had to build a high scaffold for downspout repairs on the Bank of California building in their home town. They simply fabricated staging out of 2x4s and 4x4's (seems as if you can get them in Oregon) clamped together with knife-grip steel brackets made by Northwest Tube & Metal Fabricators and furnished by Andrews Equipment Service, Portland distributors.





1 ROOF SLAB is poured first. Wooden frame, resting on structural steel of building, anchors suspenders holding form panels. **2** FORM is lowered, then top floor is poured from runways held by form tie rods. Cones keep hangers from freezing in concrete. **3** FLOOR SLAB below is poured after form is lowered and supporting rods are anchored to wood beam resting on cured slab above. **4** FORMS are stripped and reerected in one operation by lowering them one story with chain hoists hooked to suspending rods. **5** WHEN SLAB immediately above pour is too green to support forms and fresh concrete, suspenders are anchored two floors up.

SCHEMATIC DIAGRAM shows steps in D.C. system for pouring floor slabs in multiple-story steel frame buildings. Sketch details slab construction progressing downward in one typical bay. System may be applied to one or more bays or to entire floor at one time.



Building Floors In Forms Dropped

By ERNEST HEDIGER

McGraw-Hill World News
Mexico City

STARTING AT THE TOP and working down reverses the usual formula for success; but that procedure, when applied to the concreting of floors in multiple-story steel frame structures not only has proved successful but has effected savings up to 20 percent in slab costs as well. Called the D.C. System and developed and patented by Manuel Gonzales of CYR, civil engineering and architectural associ-

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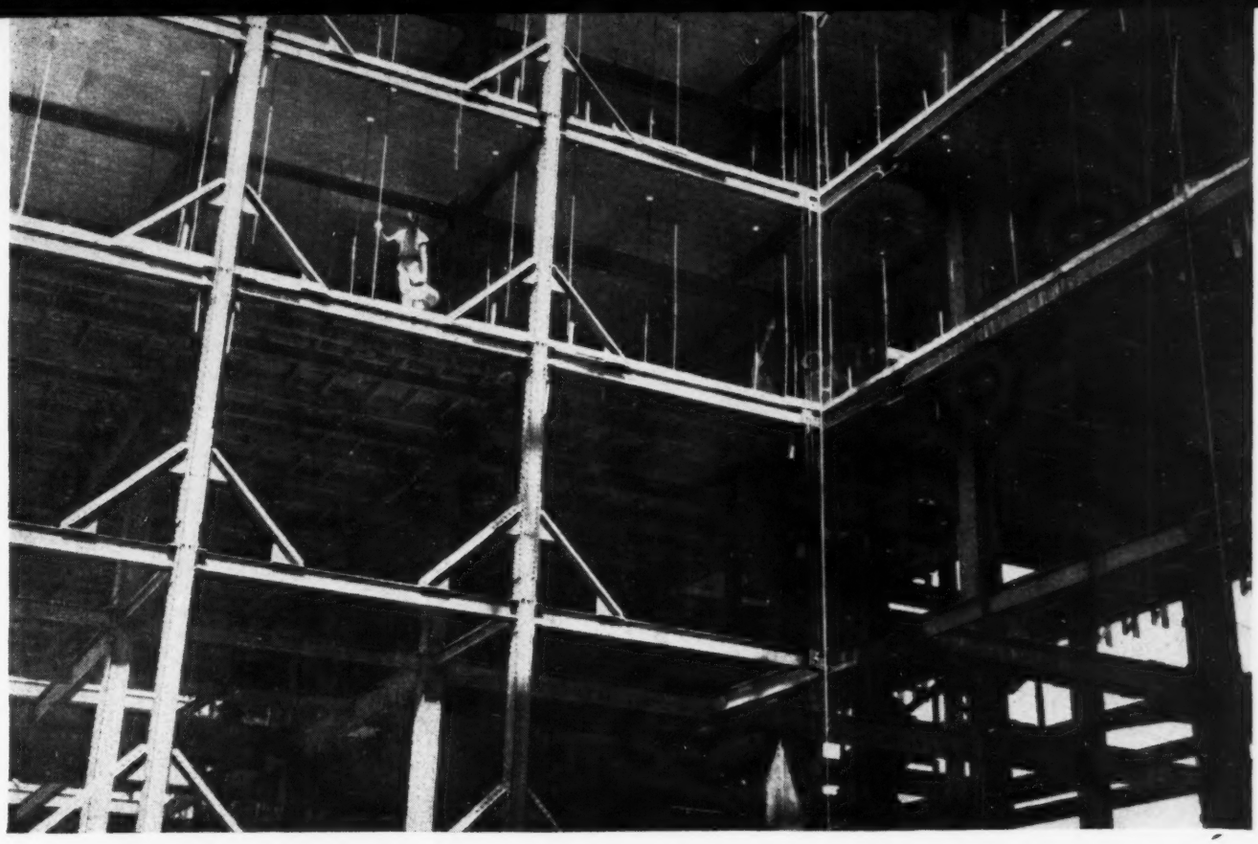
1 POURING FLOOR SLABS from top down is basis of patented D.C. System devised by Manuel Gonzales of CYR, Mexico City engineers and architects. Form panels are hung by rods from doubled timbers on cured slab two floors above pour.

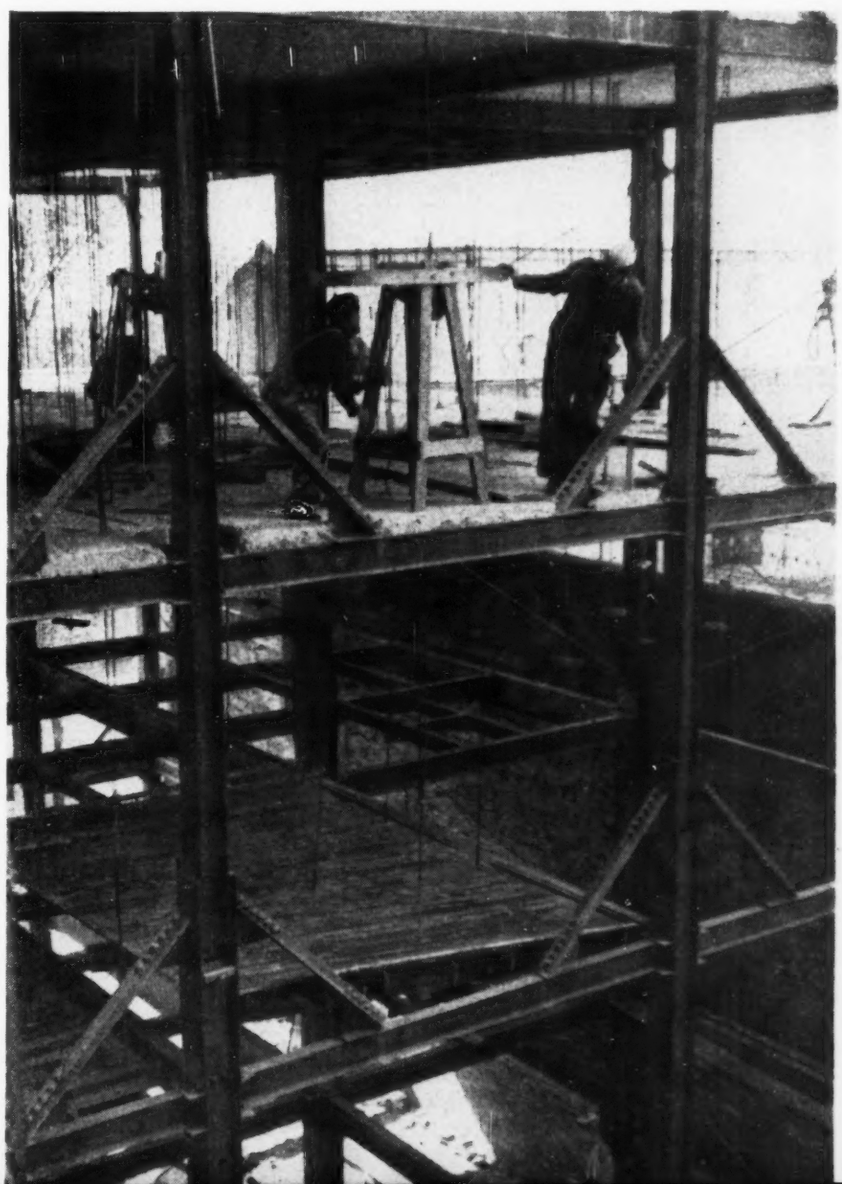


2 DESCENDING FORM resembles wall panel with sheathing, studs and walers. Steel suspenders pass through holes cast in slabs above and eliminate wire joist hangers of usual hanging form and forest of wedged shores needed with form supported from below.

Poured From Top Floor by Floor

ates of Mexico City, the novel top-floor-to-ground method incorporates descending slab forms suspended by steel rods. Forms are stripped and re-erected by slacking off the suspending rods and lowering the panel one story; a procedure so simple that for 10,000 sq. ft. of floor slab only 6 to 8 hr. elapse between the start of the stripping operation and the completion of the next pour.

The descending floor slab forms are constructed as for a normal wall panel, with sheeting on studs supported by walers. Each panel closely fills each floor bay between flanges of the bounding floor beams



3 FORM IS STRIPPED and re-erected in one operation by lowering panel with chain block to level of next lower floor. One-piece form panel closely fills building bay and, when in place, is leveled by turnbuckles on rod hangers.

and is hung by tierods fastened to the form wales and anchored to the building structure above. For the top stories, the rods suspend the form from framework bridging between roof beams, while for lower stories, doubled timbers placed on top of higher, previously poured floor slabs anchor the rods.

With the hanging form in place and adjusted to correct elevation by turnbuckles on the tierods, reinforcing steel is placed in accordance with a bar pattern permanently marked on the form panel to facilitate steel setting, and the slab is poured. An elevator hoist carries concrete to floor level and buggies deliver it to the forms over runways fastened to the form suspenders just above the floor to avoid displacing or bending the slab reinforcement. When the floor has set, two or four suspending rods, which will be used to maneuver the form into position for the next lower pour, are dropped a few inches and are refastened to chain hoists supported by small wooden frames on top of the slab. The remaining rods are completely freed and the chain hoists lower the form panel one story. All tierods are then anchored to timbers resting on one of the upper floor slabs to complete the cycle of operations.

In addition to the obvious benefits gained by working under the cover of previously poured floors, the D.C. System cuts slab construction time to 1/3 the usual—floors of several Mexican buildings having been built by this method at the rate of one floor every two days. Easy erection and stripping give the one-piece slab forms an unusually long life, which has run as high as 30 re-uses.

Prefab Units Move From JEEP TO JIG TO JOB

JIGS FOR WALL SECTIONS AND TRUSSES aid prefabrication of component parts of buildings at plant of Farwest Sales & Engineering Co., Tacoma, Wash. Material is hauled to jigs in Jeeps.

ROLL-AWAY CARTS (below) of welded aluminum tubing aid workmen in moving prefabricated wall sections.

MATERIALS for 100 prefabricated housing units for faculty members of the University of Washington are hauled to jigs in converted jeeps, fabricated, and then delivered to the Seattle campus in packaged truck loads. University officials specified prefabricated wood units for the project because of their low cost and speed of erection. The houses will be rented to faculty members at $50 to $60 a month, furnished, with most of the utilities provided.

The units are contained in 50 duplex buildings fabricated by the Farwest Sales & Engineering Co., of Tacoma, and erected by the Olav Boen Construction Co., Seattle, at a total cost of $5,200 for each erected building, or $2,600 a unit. This cost includes plumbing, electrical work, landscaping, paving, utilities, floor furnaces and linoleum floor covering in the kitchen, bathroom and utility room.

Each building is 25x62 ft., with one unit 37 ft. long and the other 25 ft. Each unit has a kitchen, combination living-dining room, utility room and bathroom with shower, one unit in each building having two bedrooms, the other three. Both front and rear entrances have covered porches. An unusual touch will be stainless steel sinks and gutters, fabricated in University shops from University-acquired

government surplus. The buildings are erected on 8-in. concrete foundations with footings.

Described by Farwest as "standard construction adapted to assembly line production," the walls are built with 2x4s spaced 16 in. apart. They include two layers of waterproof sheathing paper, 5/16 in. veneer for sheathing, 1x4-in. nailer strips and the exterior finish of either plywood, pre-dipped cedar shakes, cedar siding or vertical knotty pine.

Rolled roofing is applied to the pitched roof and ¼-in. plywood, finished with either wall paper or texture paint, is used for the interior.

The sections are prefabricated at the Farwest plant in Tacoma in a former aircraft assembly building. The saw line is outside the building and the materials needed for each section are delivered by jeeps used as industrial tractors, to jigs inside the plant. After assembly, the sections are carried on specially designed roll-away carts to the loading platform.

The sections, numbering about 30, are piled in the order they will be used at the building site and rolled on to the truck for shipment to the U. W. campus, some 45 mi. away. Each load, or package, comprising all the materials for one building, weighs 17,000 lb.

At the site, the load is rolled on to the previously placed subfloor, and the sections are taken off the pile in the order they are needed. The erection requires 4 hr., with the same roll-away cart employed at the plant now used to carry the sections to their proper places.

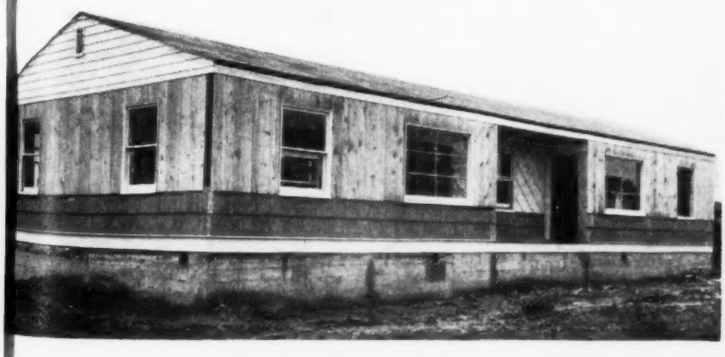
John W. Kesinger is president of Farwest, with M. C. Perkins as chief engineer and J. J. Chandler secretary-treasurer.

GUY McGEE, plant superintendent of Farwest Company, measures a package of building sections, stacked and ready for transport to Seattle. **JOHN W. KESINGER**, company president, is second from left.

TRUCKS HAUL COMPLETE PACKAGE of wall and roof sections. Here is load dumped on previously-placed floor panels.

SIMPLE CONSTRUCTION of duplex units is shown by this interior view (below). Note finished flooring laid over plywood panel subfloor.

EXTERIOR FINISH is cedar siding, pre-dipped cedar shakes, plywood or vertical knotty pine, sometimes used in combination. On this nearly finished house all four types are in evidence.



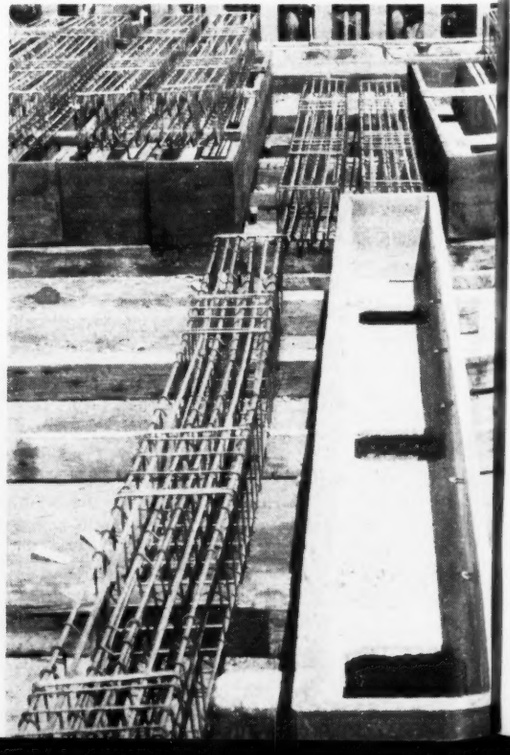
Precast Concrete Members Frame Long Causeway

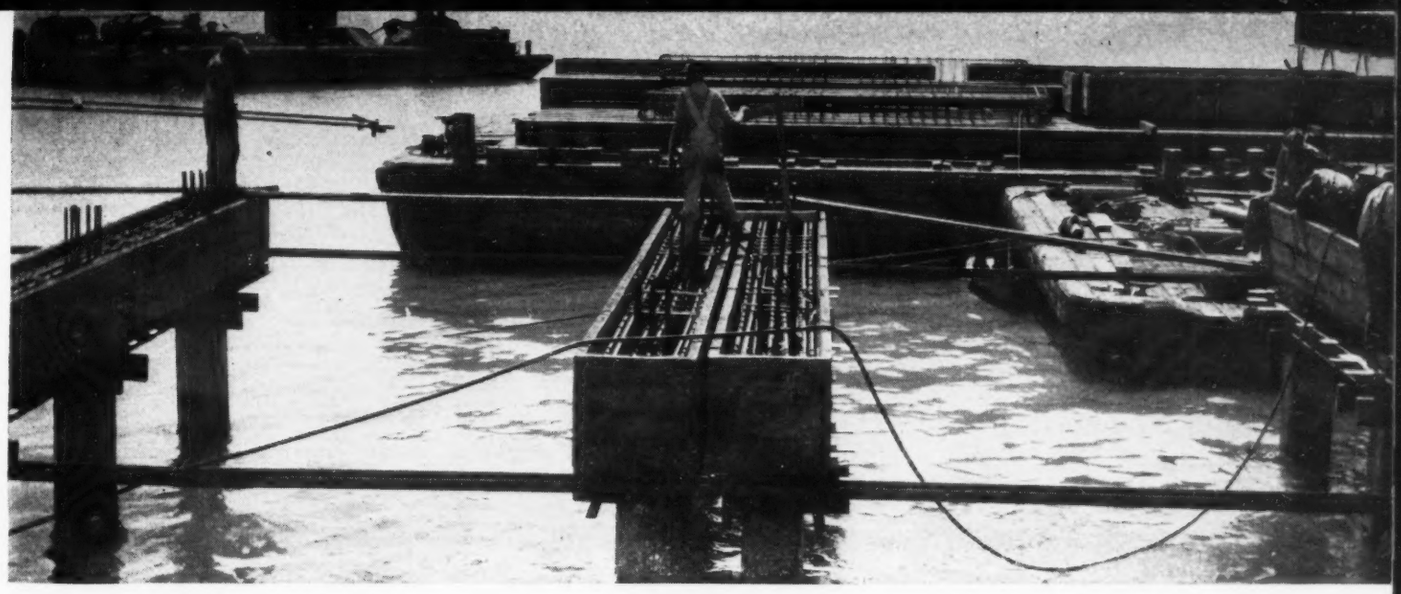
PRECAST CONCRETE UNITS, including piles, deck slabs and even precast forms for poured-in-place pile caps, highlight the construction of a 4,000-ft. causeway recently completed at the Standard Oil Co. of California's, Richmond, Calif., plant. Structural members and cross-cap forms were precast by the general contractors, Swinerton & Walberg Co. and Ben C. Gerwick, Inc., in a shorefront yard for easy water shipment to the job site where floating equipment assembled them into a substantial causeway. Erection proceeded on an assembly line basis with specialty crews driving, aligning and capping piles and placing deck slabs.

The long causeway, which leads to an offshore tanker loading wharf, is 26 ft. wide with a 24-ft. roadway and is designed to carry heavy truck traffic. Supporting piles are precast reinforced concrete, 18x18 in. square and up to 90 ft. long, and are bonded into three-pile bents by 26-ft. long cross-caps 28 in. wide and 30 in. deep poured within precast concrete shells. These forms, each weighing about 4 tons, were open-top boxes with 3-in. thick walls and 2-in. bottoms reinforced by $\frac{3}{8}$- and $\frac{1}{2}$-in. rods. Three 24-in. square holes in the box bottom permitted the pile tops to project into the form for bonding into the cast-in-place cross-cap. The pre-

SIX-POINT PICKUP (below) swings 18x18-in. concrete pile into driver leads on San Francisco Bay 4,000-ft. causeway. Note loose pipes at bottom of hammer assembly that aid in threading projecting reinforcing into cushion block.

PRECAST FORM (below) for cast-in-place pile cap has bottom openings through which piles project for bonding into beam. Prefabricated reinforcing cage is dropped into form after box is placed over piles.





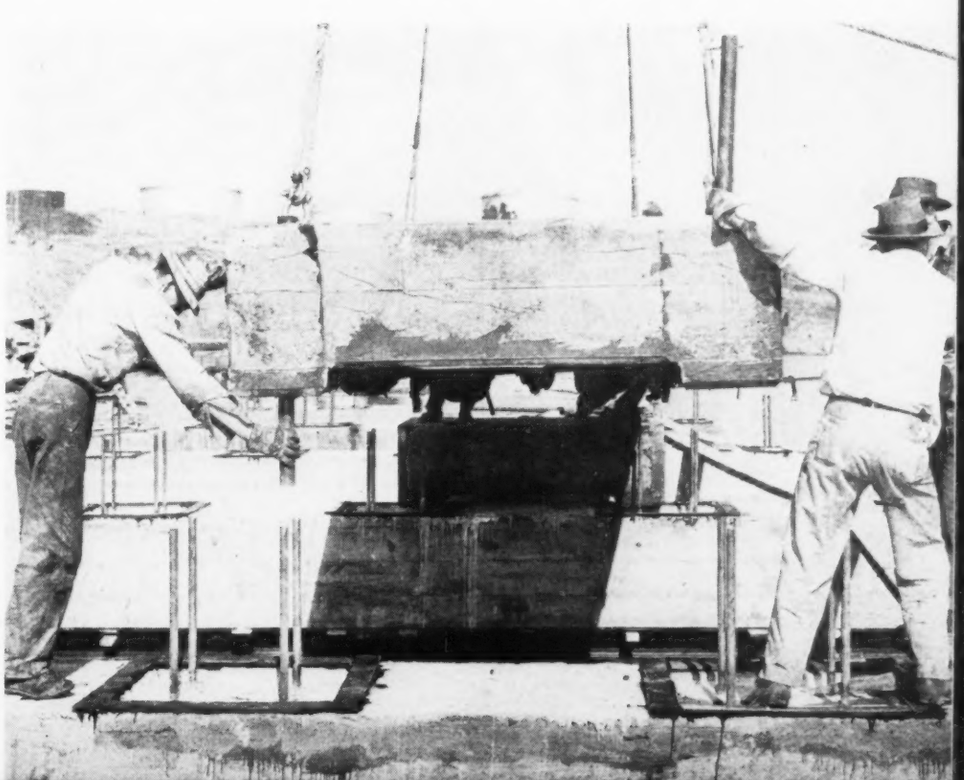
BENTS ARE DOUBLED about every 600 ft. for expansion joint. Temporary transverse channel girts support precast form for pile cap, and longitudinal channels space bents to receive precast deck slabs. Girts, clamped to tops of piles by cross-bolts, are given additional support by timber collar underneath, also clamped to pile.

cast concrete shells not only eliminated the difficult overwater erecting and stripping associated with the usual wood forms, but in themselves furnish a permanent extra thickness of concrete to protect the pile caps from the destructive action of salt water. Four precast beam-and-slab combinations deck each bay and span between pile bents, which are on 20-ft. centers. Each integrally-cast deck unit weighs 15 tons and is a dished section about 6½ ft. wide with edge beams 24 and 20 in. deep at sides and ends respectively of a 7-in. thick central slab. Plans called for the completion of the roadway with a 3-in. asphaltic wearing surface on the causeway deck.

Casting Procedure

Causeway members were precast on concrete pallets in a yard on a tributary of San Francisco Bay about 17 water miles from the job. Piles were cast in four-high tiers within steel forms, but the deck slabs and cap shells were poured against wooden form panels. To keep formwork and lumber to a minimum, the cap box pours were spaced so that alternate, previously cast shells would act as exterior wall panels for the intermediate pours. Form surfaces were covered with building paper

DECK SLAB AND BEAMS are precast integrally in form lined with building paper stapled to panels. Concrete casting is 20 ft. long to span between pile bents and has minimum slab thickness of 7 in.



LOOSE PIPES in 3-in. holes of 15-ton deck slab guide it over 1¼-in. dowels embedded in pile cap. Asphalt strips prevent escape of grout that will be poured around dowels to bond deck to pile cap. Crew places average of eight precast slabs per hr.

to prevent adhesion of the concrete.

Concrete, delivered to the yard in transit-mix trucks, was dumped into the forms from buggies and was thoroughly vibrated. To make the precast units more impervious to moisture, and to improve the flow of concrete around the heavy reinforcing, an emulsified asphalt product called Hydropel was added to the mix in the proportion of 1½ gal. to each sack of cement. It is stated that this admixture, by cutting absorption to between 15 and 25 percent of that for plain concrete, has greatly increased the members' resistance to sea water at a cost considerably less than for a protective coating as was originally contemplated.

After curing, overhead gantries spanning the casting bays loaded the precast members on to barges for delivery to the causeway. A trussed strongback suspended from the gantry lifted the piles with a five- or six-point pickup, while a spreader beam beneath the truss handled the precast forms through seven pairs of lifting hairpins embedded in the shell walls. Lift hooks cast near each corner of the deck slab units gave them four-point suspension.

All work in assembling the causeway from the precast units was done with floating equipment. After the piles had been driven they were temporarily tied together by steel channel girts bolted to them. Transverse girts were set at proper elevation to support the cross-cap shells, while longitudinal channels aligned the piles to insure an exact fit for the deck slabs subsequently placed. With piles lined up and cap forms set to grade, reinforcing cages were placed in the boxes, dowels for anchoring the deck slabs were inserted, and the cross-caps were poured. When the caps had set up, the deck slab-and-beam units, with holes cast in each corner of the members, were threaded over the anchor dowels left projecting above the pile caps. Grouting the dowels into the holes tied the causeway components into a sturdy structure.

The causeway is part of a $4,370,000 modernization program to improve the oil shipping facilities at Standard Oil Co. of California's Richmond refinery. The work is under the general direction of R. W. Parker, chief engineer of the manufacturing engineering division, and A. W. Gleason, refinery management representative. Design and supervision of construction is by Austin W. Earl, San Francisco, assisted by J. G. Wright. Milton H. Watt was the Earl organization's resident representative on the causeway. Two San Francisco construction firms, Swinerton & Walberg Co. and Ben C. Gerwick, Inc., as joint ventures were contractors for the causeway job; with Alfred Cantor, Gerwick's general superintendent, as project manager for the combine. The Gerwick firm owns and operates the precasting yard.

OVERHEAD GANTRY (below) with trussed strongback loads 80- to 90-ft. concrete piles on to barge for delivery from shorefront casting yard to causeway project.

Cited for Service

FORREST W. PARROTT

ONE MAN who has taken seriously Francis Bacon's maxim: "I hold every man a debtor to his profession," is Forrest W. Parrott, vice-president of C. F. Lytle Co., general contractors with headquarters at Sioux City, Iowa. For years Parrott has served his profession by taking an active part in contractor association affairs. He started as director of the Iowa branch of the A.G.C., the Association General Contractors of Iowa, becoming president of the chapter in 1935.

Culmination of his long interest in contractor affairs and an indication of the esteem in which he is held by his fellow men is Parrott's election to the presidency of the Associated General Contractors of America for 1947. He will take office at the annual convention in Chicago late in January. For the last year he has been vice-president of the association.

His national A.G.C. service started way back in 1936 when he was elected a director, an office he has held continuously ever since. He was chairman of the Highway Division in 1940. Probably his most important contribution to the association, however, has been his chairmanship of the Legislature Committee the last two years. He has successfully analyzed the hundreds of bills proposed by Congress each session pertaining to construction, and has kept the contractors well informed on national legislation. Numerous undesirable bills have been squelched and many appropriate acts have been passed as a result of his committee's work.

Forrest Parrott is one of those successful contractors who came in from the outside. Born on an Iowa farm, he completed his education at Iowa Wesleyan University, taking a business course. After serving some time as a college instructor and county superintendent of schools, he was elected auditor of Des Moines County. Later he became auditor and purchasing agent for the State Highway Department.

In 1921 Parrott joined C. F. Lytle Co. and has never left them. Despite his lack of technical training, he has an unusual grasp of the practical side of construction. Since he has been with Lytle, the firm has completed scores of highway, bridge, dam, airport, power, river improvement and building projects, throughout this country and Alaska. Their wartime jobs include co-ventures on Fort Leonard Wood, Mo., and Camp Carson, Colo.

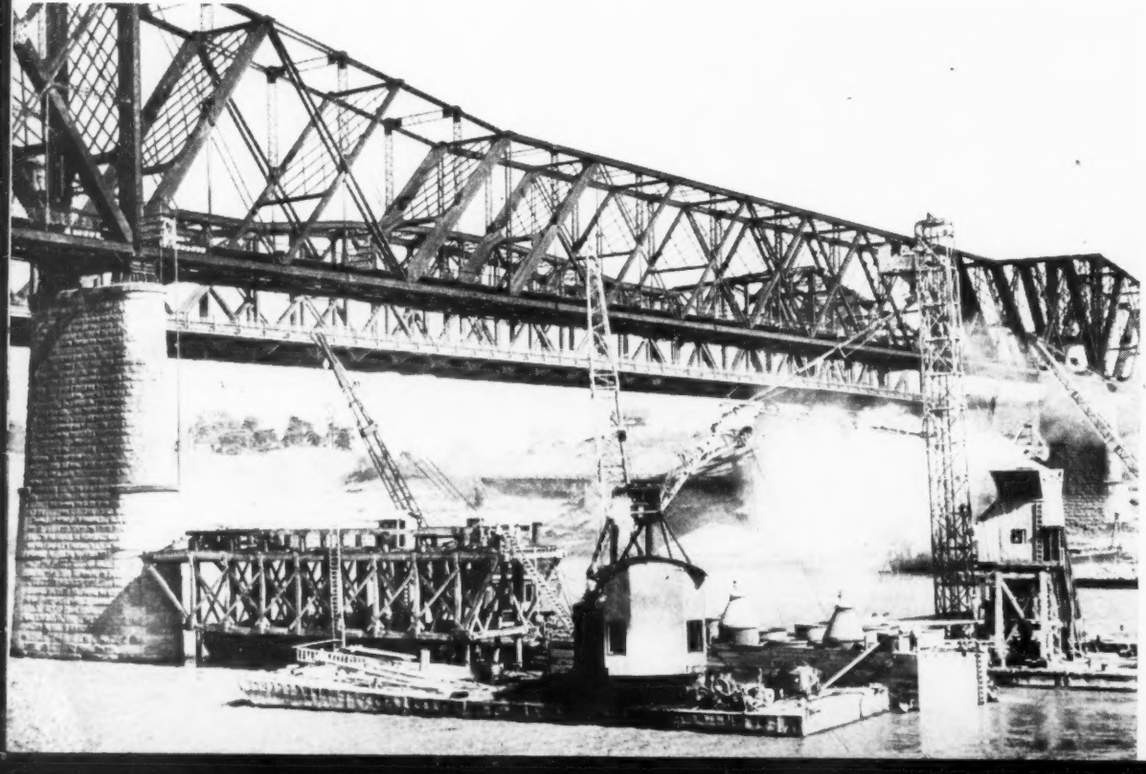
In 1941 Lytle, associated with Ralph Green of Des Moines, went to Alaska to build the first airports in the national defense program. The successful completion of these and other projects in the Territory in the face of most discouraging difficulties and odds is a thrilling chapter in construction history. When the Alaska Highway project came up in 1942, this same combination was retained as managing contractors for the Alaska section. Parrott was actively associated with all these projects.

Because of his interest in association affairs and his zeal for bettering the lot of contractors, Forrest Parrott's term as A.G.C. president promises to be most successful.

THIS MONTH'S NEWS REEL

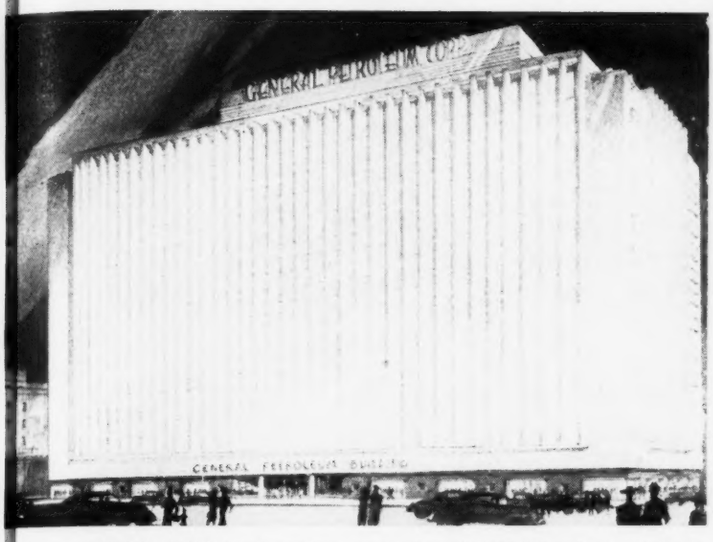
TO HOUSE 608 families, John Lovejoy Elliott housing development is being constructed between Ninth and Tenth avenues and 25th and 27th streets in New York City. Corbetta Construction Corp. had $230,000 contract for foundations, while HRH Construction Corp. is building superstructure for $2,747,345. Acme Photo

MISSISSIPPI RIVER LEVEE JOBS, such as this one near West Memphis, Tenn., being built by Bill Owens Construction Co., Munford, Tenn., have been saved from complete shutdown by recent $70,000,000 boost in Army Engineer allotments following earlier Presidential decree on curtailment of public works. Owens is using fleet of Heil cable scrapers, pulled by International tractors, to move heavy gumbo from riverside borrow pits.

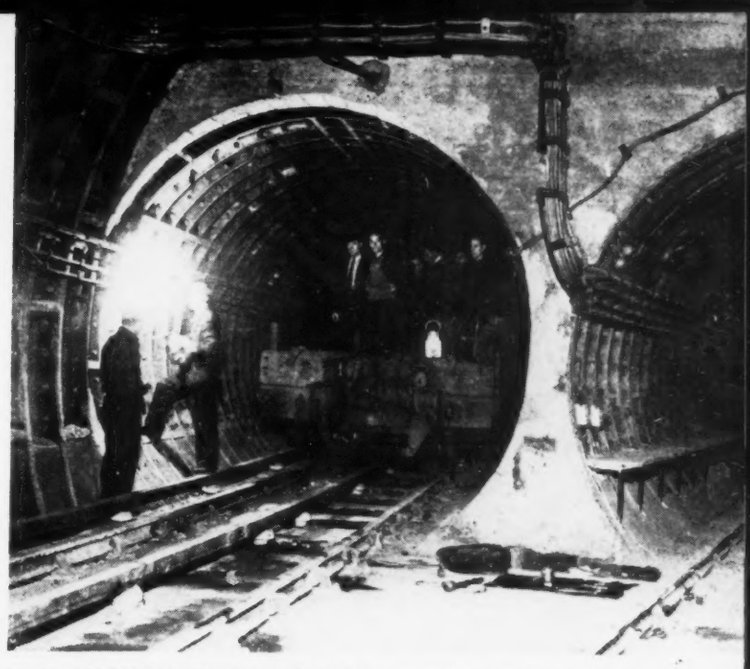


PIERS for new Mississippi River bridge rise out of water at Memphis. Merritt-Chapman & Scott, of New York, is completing seven main piers under $4,333,000 contract and is starting work on Arkansas approach foundations under new contract. River pier caissons are being sunk under air to 122 ft. below water.

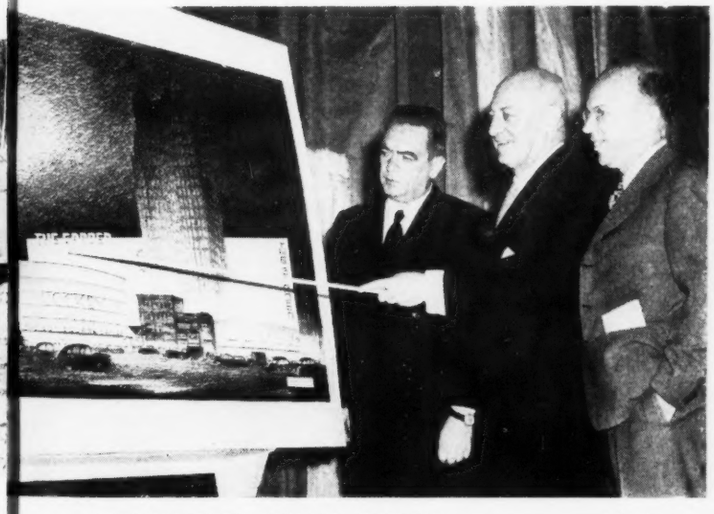
Acme Photo



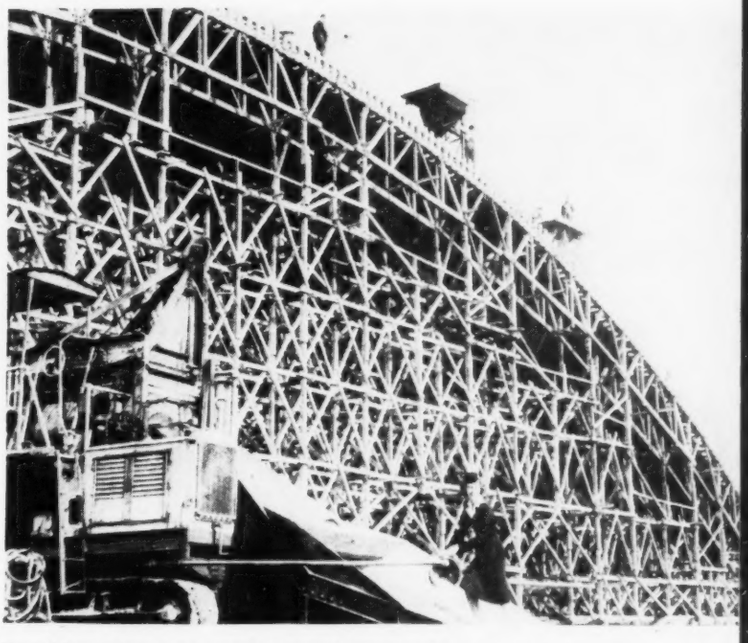
OFFICE BUILDING costing more than $5,000,000 will be built in Los Angeles by P. J. Walker Co., contractors for General Petroleum Corp. Structure, for which architect's drawing is shown, will be half a block deep and 13 stories high and will provide about 450,000 sq. ft. of floor space.



NEW $20,000,000 TUBE EXTENSION, carrying East London's underground railway from Liverpool street to Stratford, was opened in December. Here workmen put finishing touches on line at Bethnal Green. British Combine Photo

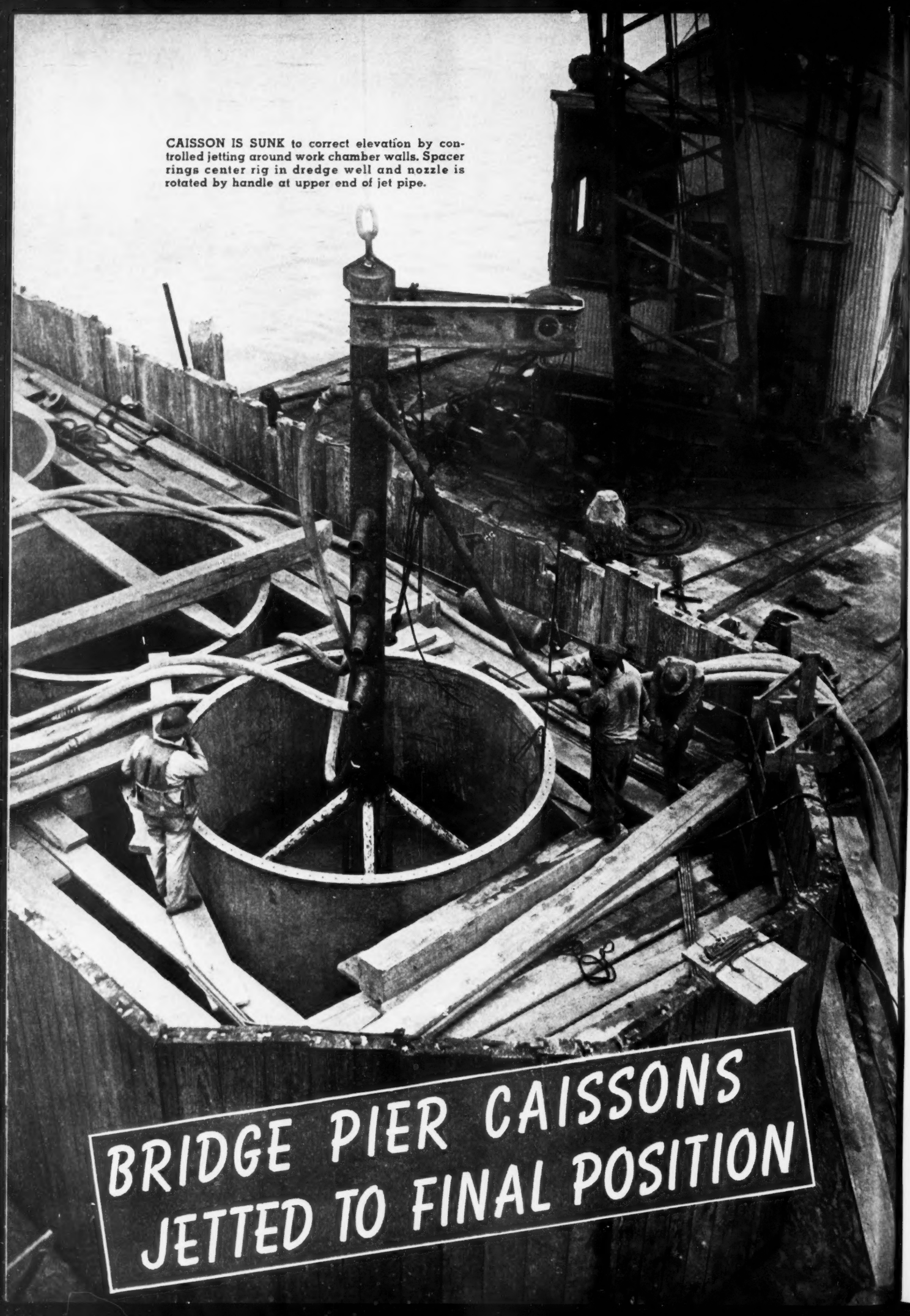


NEW MADISON SQUARE GARDEN will cover two-block area west of Columbus Circle in New York City. Construction of huge building, which will cost $20,000,000, is slated to begin late in 1947. Studying drawings are (left to right): **MAYOR WILLIAM O'DWYER, GEN. JOHN REED KILPATRICK**, president of Madison Square Garden Corp., and **GEORGE SPARGO**, general manager of Triborough Bridge Authority, which will finance project through bond issue. Acme Photo



WORLD'S LARGEST COMMERCIAL HANGAR, according to reports, is being built by Corbetta Construction Corp., of New York, for American Airlines at Chicago airport, on $1,500,000 contract. Here completed forms await concrete pouring. Acme Photo

QUONSET HUT SETTLEMENT (below), known as Rodger Young Village, in Griffith Park, Los Angeles, is said to be largest veterans' housing project of its kind in country. Its 1,500 units were built by Baruch Corp., of Los Angeles, for $3,081,000. Wide World Photo

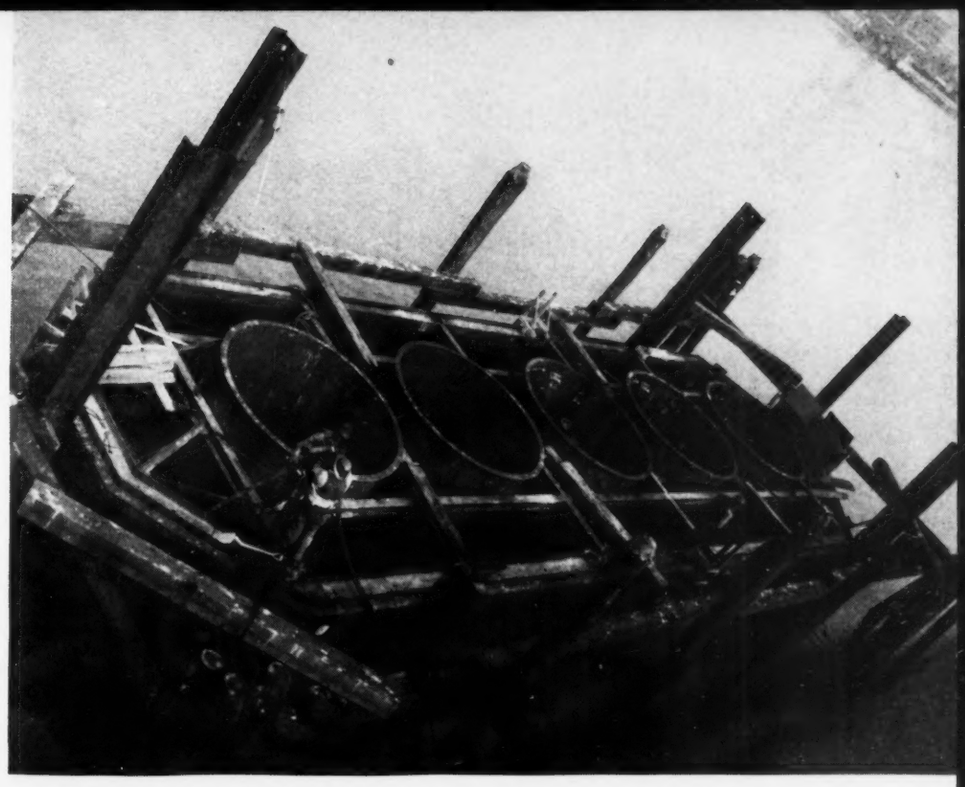


CAISSON IS SUNK to correct elevation by controlled jetting around work chamber walls. Spacer rings center rig in dredge well and nozzle is rotated by handle at upper end of jet pipe.

BRIDGE PIER CAISSONS JETTED TO FINAL POSITION

By **KENNETH C. COX**

Engineer, Dravo Corp.,
Pittsburgh, Pa.



FIRST OPEN CAISSON SECTION for one of 22x77-ft. piers of Anacostia River bridge at Washington, D. C. is floating steel structure shown here inside protective stall. Steel pile spuds and controlled excavation will keep unit at correct location during sinking.

AN EXCELLENT EXAMPLE of modern open caisson bridge pier construction is the foundation work now being done for the Board of Commissioners of the District of Columbia by Dravo Corp., Pittsburgh, as part of their $2,500,000 contract for the substructure of the South Capitol St. Bridge over the Anacostia River at Washington. Sunk within protecting and guiding stalls by controlled clamshell excavation through dredge wells, the caissons are inched to final elevation by jetting within the working chambers. A long hinged nozzle at the base of the jet pipe enables the rig to pass through the dredge tubes and open into the chamber to flush walls, roof and bottom to bring the caisson to grade.

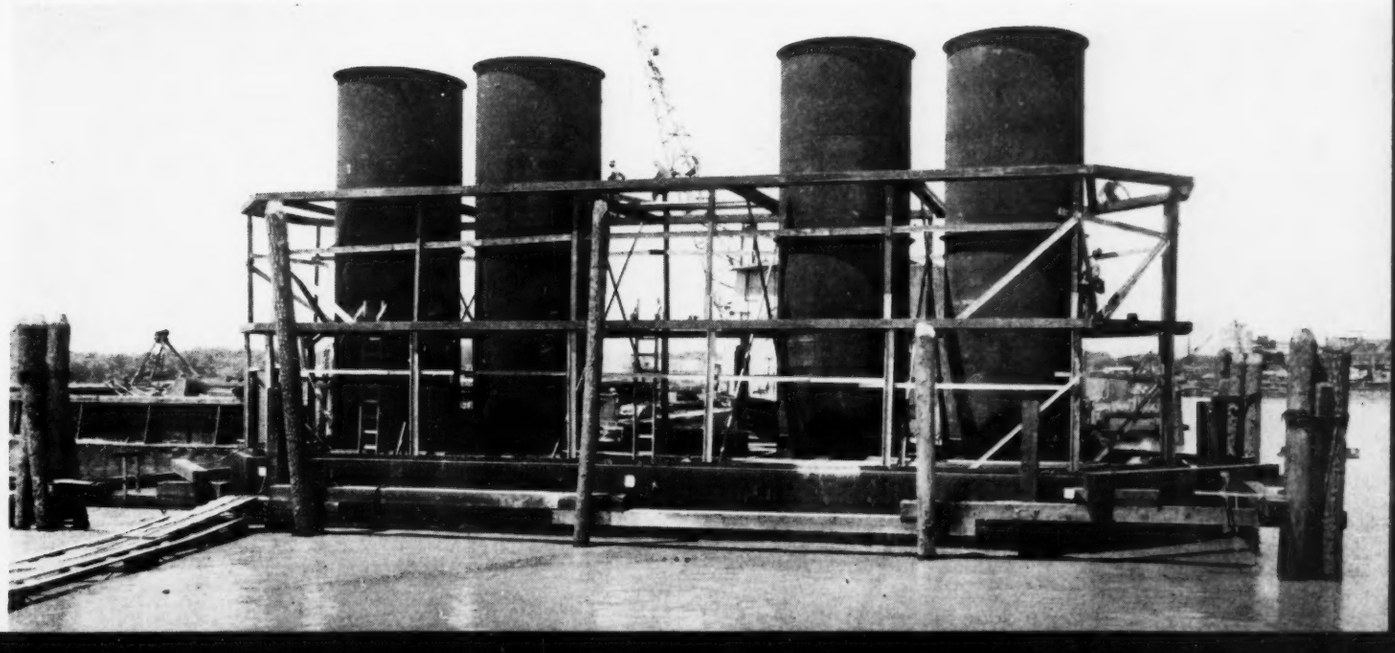
Typical of the substructure operations on the project is the construction of pier G, 22x77 ft. in plan, founded on hard blue-gray clayey sand 65 ft. beneath the water surface and 45 ft. below river bottom.

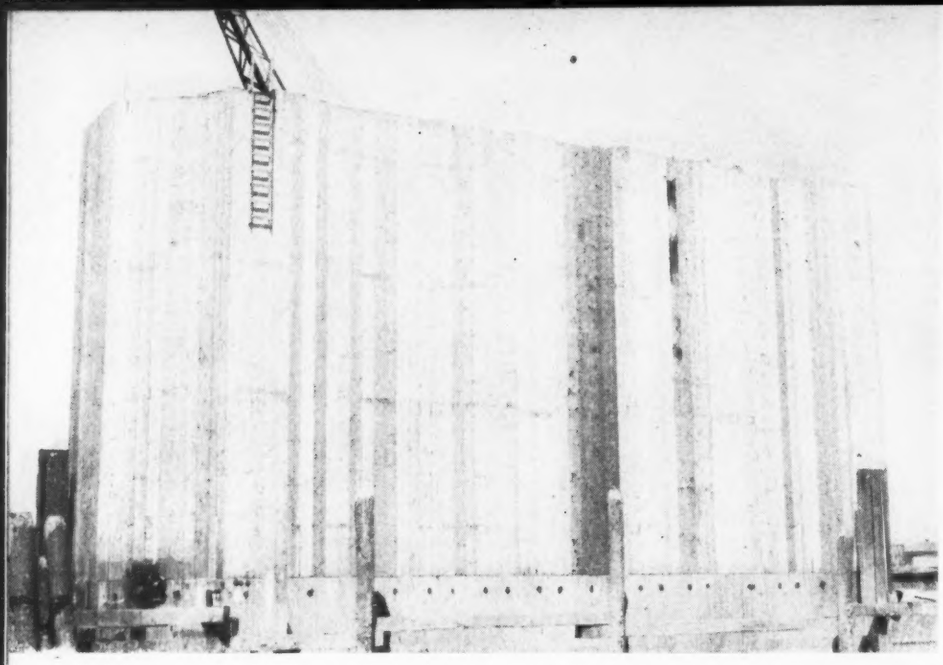
The first section of the pier G caisson was a floating, box-like steel structure partly open at the top and bottom. The outer skin of this floater extended vertically 16 ft. above the cutting edge, while the inner wall ran at 45 deg., from the cutting edge to the working chamber roof 6 ft. above. Five 10-ft. dia. open-end dredge tubes on the caisson centerline extended through the working chamber roof to 2 ft. above the outer skin. The air space between the outer shell and the inner wall, made up of the tubes and the working chamber's roof and sloping sides, furnished adequate buoyancy to permit the caisson to be towed to the job from the fabricating yard in Delaware.

At the bridge site the section was floated into a previously-constructed stall of piling and timber within which steel piles had been driven as spuds for the caisson. The stall furnished substantial mooring facilities for the construction plant and protected the caisson from ramming by river craft, while the spuds, 24-in., 100-lb. WF sections driven two on each side and one at each end of the caisson, were to guide the unit to its correct position in the river bottom.

With the steel floater in place inside its stall, concrete ballast was poured between shell and dredge tubes to increase the caisson's stability, and a 29-ft. high steel and timber cofferdam section was added to its top. Steel tubes extended

DREDGE WELLS (below) 10 ft. in dia. and open at top and bottom are extended to form inner walls of 29-ft. high cofferdam section on top of 16-ft. floater. Steel sets are erected to brace outside shell of 6x12-in. splined sheeting subsequently placed. Concrete will be poured in dry between dredge tubes and sheeting to sink unit to river bottom.





POURING CONCRETE into caisson and excavating beneath structure by clamming through dredge wells, sinks unit through river bottom. Second cofferdam section 24 ft. high, shown here, is added when caisson's cutting edge is about 40 ft. below river surface and 20 ft. in bottom material.

the dredge wells, and 6x12-in. splined timber sheeting, calked with cotton and braced by steel sets or compression rings and struts at 10-ft. intervals, was bolted to the floater to form the upper outside caisson shell. Concrete was poured in the dry within the caisson walls until the unit sank to river bottom, after which clamshells working through the dredge tubes excavated the working chamber.

The cycle of pouring and excavating continued, with the caisson sinking, because of its ever-increasing weight, into the hole dredged under it. When the freeboard of the first-attached section of the caisson had been reduced to about 2 ft., a similar cofferdam section 24 ft. high was added and the sinking process was continued.

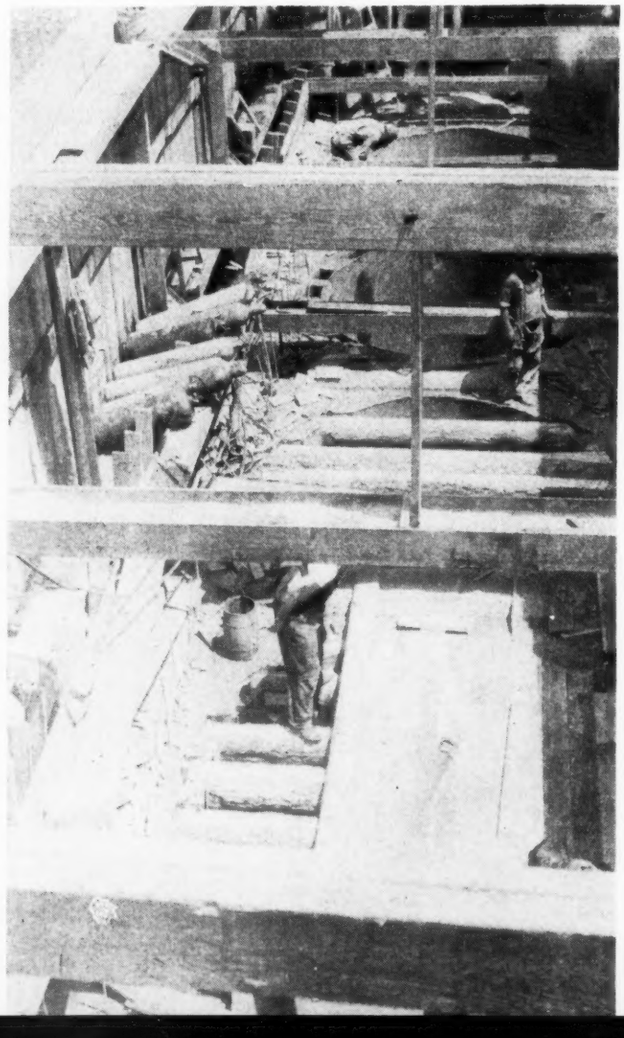
After the cutting edge of the caisson had penetrated to within 2 ft. of its planned elevation, excavation was stopped and a jetting rig was inserted down the dredge tubes. This jet, controlled from the surface and especially designed to operate within the working chamber, is a long pipe with a tapered nozzle at its lower end hinged to fit in the dredge well and unfold in the chamber below. The jet was methodically moved to clean the chamber walls and roof and level all uneven spots on the bottom, yet leave undisturbed material banked against the cutting edge to prevent further sinking of the caisson. With the working chamber cleaned, controlled jetting along its interior perimeter brought the caisson to correct grade. All jetted material was removed by clamshell and, after a final inspection of the chamber by a diver, the caisson

←

SPECIAL JET is inserted down dredge tube to clean work chamber after excavation and concreting cycles have sunk caisson to within 2 ft. of final grade. Long nozzle is hinged at base of jet pipe to pass through well and open into chamber.

→

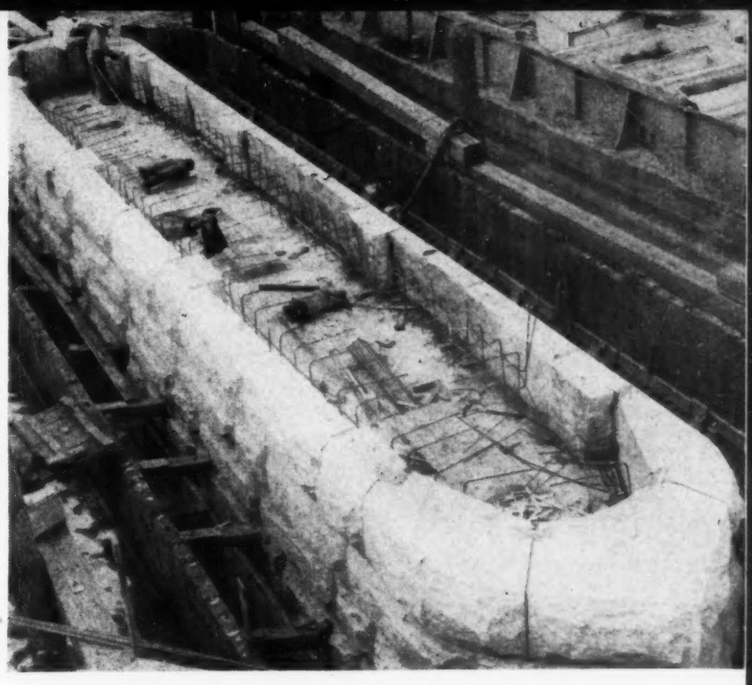
AFTER CONCRETE SEAL is tremied into work chamber and lower 6 ft. of dredge wells, tubes are burned off and wells are bridged with pile butts to carry distribution block pour. Caisson rests on firm material 65 ft. below river surface. Top of concrete shown is 19 ft. lower than surrounding water.



was allowed to rest undisturbed for 5 days to make sure there was no tendency for further sinking. After the waiting period, a concrete seal pour was tremied into the work chamber and carried up 6 ft. in each of the dredge wells.

Digging and jetting had been controlled to maneuver the huge mass of concrete, steel and timber into its correct location and the position of the caisson during sinking was checked daily by triangulation and level readings from shore. The final position of the pier G caisson differed from the plan by a maximum of 2 in.

With the sealing operations completed, pier G was a block of concrete resting on good foundation material 65 ft. below water. The sheeting of the second attached cofferdam section of the caisson extended 2 ft. above the river surface, and the top of concrete within this shell was 19 ft. lower than the surrounding water. The upper ends of the dredge tubes extending above the concrete were then burned off, the wells decked over and a reinforced concrete slab 11½ ft. wide, 71 ft. long and 14 ft. thick was poured to distribute bridge loads over the caisson area. Above the distribution block, granite masonry was set in two-tier courses backed with concrete to form the facing of the pier, the construction of which was completed by removing the cofferdam and stall and setting grillages for the bridge superstructure.



GRANITE FACING backed with concrete is carried up on top of 14-ft. thick reinforced concrete distribution block within cofferdam section. With top of pier above high tide, cofferdam will be removed and piling pulled.

Equipment working on pier G included a floating concrete barge with two 2-yd. mixers, three derrick boats, two whirlers, seven barges, a compressor and pump barge and a 125-hp. towboat; all designed and built by Dravo Corp.

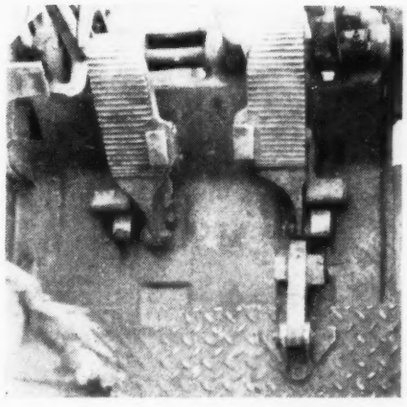
The South Capitol Street Bridge is being built by the District of Columbia for which Brig. Gen. Gordon R. Young is engineer commissioner. H. C. Whitehurst is director of highways, C. R. Whyte, bridge engineer, and Albert B. Greene, resident engineer on the job. Modjeski and Masters, Harrisburg, Pa., are consultants for the project. For the Dravo Corporation, the author is resident engineer.

A Couple of Safety Ideas

By EDGAR N. GOLDSTEIN

San Francisco, Calif.

CONSTRUCTION SAFETY is just a lot of common sense plus a few clever ideas. Two such ideas have just come to the attention of the writer. These are a special additional safety brake for cranes and shovels, and a neat method of setting up safety gates for shaft openings in building jobs.

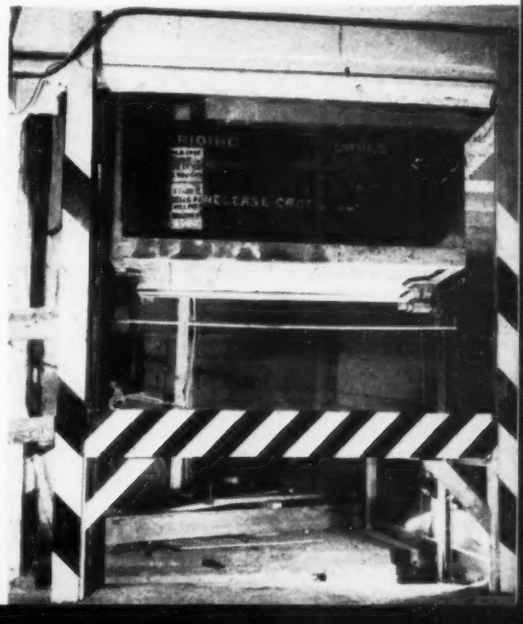


EXTRA DOG on crane or shovel brake pedal locks hoist load line, minimizing accidents due to wilful or accidental release of brake pedal.

The crane brake shown consists of a hinged safety lock for the load line. It is simply an eared dog, which locks easily against load line pedal brake. This additional dog eliminates all possibility of youngsters releasing the brakes in unwatched rigs or shaking loose of the brake by blasting or by other disturbances.

The safety shaft gate is likewise a simple application. A metal bar, hooked up through small cables to a gate obstruction, hangs in the shaft. As the cage descends, the bottom of the elevator engages the bar, pulling the gate up in the clear at the shaft opening. When the cage rises, the shaft gate drops.

BAR ACROSS SHAFT of temporary elevator (below) raises and closes shaft gate. When cage descends, bar and cable assembly raises shaft pole; when cage rises, gate is automatically closed. Note signal code posted in elevator cage for additional safety precaution.



Accounting for

FIFTH OF A SERIES OF SIX ARTICLES BY GUY M. CARSON,

JOB RECORD SHEET — Job No. 102

Owner John Doe — Project Location 411 W. Butler

Address 120 So. Western Ave. — Telephone No. 706-J

Recap of Costs (Memo Only)		Date 194-			Debits	Date 194-		Credits
Materials	$100.00	Apr.	1	A.B.C. Sup. Co. Material	100.00	Apr. 15		640.00
Labor	123.00		1	M. Andre Sub-Contr.	100.00			
Misc. Exp.	41.50		1	City Permit	2.00			
Sub Contractors	200.00		1	Whitley Sub-Contr.	76.00			
			1	Wages From P.R.	103.00			
Direct Job Costs	464.50		4	H. & R. Trucking Tot.	21.00			
Overhead - 25%	116.12							
Total Costs	580.62							
Sold For	640.00							
Profit on Job	59.38							

Job No. _____

Owner _____ Project Location _____

Address _____ Telephone No. _____

Recap of Costs (Memo Only)		Date			Debits	Date		Credits
Materials	$							
Labor								

Fig. 1 . . . JOB RECORDS are financial log of your business. They show you where you are going, where you have been, and how you got there. They point out both fair and stormy weather along money route. For small jobs this short form ties up all job cost information in small packages, with room for four projects on one sheet.

Job Cost Records

SUCCESSFUL CONTRACTING and good accounting practice go hand in hand. Of course, a sound accounting system does not guarantee the success of a construction venture, but it certainly helps. And, of course, at times a few contractors make money without proper cost records, but they are operating in the dark with the cards stacked against them.

Some contractors shun adequate cost accounting because they are afraid of it, they think it is something mysterious and complicated beyond comprehension. In the evolution from old-time bookkeeping perhaps some accounting systems have grown rather complicated. However, the basic principles remain simple, and the author, after investigation of the practices of many successful contractors, has developed the accounting system outlined in this series of articles as one designed to be as simple as possible yet giving all the necessary information.

A Job Record, to be of any value, should show whether a profit or loss is made on a job, and where such profit or loss occurred. If the job is a big one and long-drawn out, involving several operations, the contractor should know how he is coming out on each operation as the job progresses. He can then size up the situation from time to time and make the necessary changes if the job is not progressing profitably and properly.

Keeping track of the job while it is under way has many advantages over waiting until it is finished and then getting the bad or good news. After the job is done it is too late to do anything about it, whereas if you had kept score during the game you might possibly have seen to it that money was made, or saved, and perhaps averted some losses.

On all jobs, the Job Record, when completed, should show all the direct expenses of that particular project and should be compared with the estimate. This gives the contractor a check, not only on his production, but on his estimating, and keeps him informed at all times. The contractor then, literally knows his business. He

for Contractors... 5

SON, COMPTROLLER, TALLMAN, ROBBINS & CO., CHICAGO, ILL.

knows where he is making money and where he is losing it, and can correct the bad situations.

Accounting is simply knowing all the mathematics regarding a business. Lack of that knowledge has caused thousands of men to fail. Disregarding accounting principles threatens your success. You'll need a rabbit's foot or a horseshoe if you try to operate without proper cost keeping.

Here are two examples of the right kind of Job Cost Records. One is for a small repair job; the other for a larger job. In the author's contractors' accounting system both are handled alike.

The short form reproduced in *Fig. 1* is recommended for small jobs, such as alterations, where the items are few and the life of the project is short. This sheet accommodates four jobs, two on each side. Note that provision is made for recapping the costs in the left column. All costs are entered from Cash Paid Out and Payroll Records, and credits are transferred from Cash Receipts. Payroll Rec-

JOB LEDGER SHEET

JOB OR PROJECT NO. 10

ARCHITECT M. Andre — OWNER A. B. Jones — PROJECT LOCATION 221 W. Washington

TELEPHONE NO. 8111 — ADDRESS Rm. 220 Ins. Bldg — TELEPHONE NO. 7505 J

ESTIMATE COST (MEMORANDUM ONLY)		DATE 19—	DIRECT OPERATING EXPENSES	FOLIO	✓	DEBITS
Architect	$ 125.00	Apr 1	Bldg Sup Co Lime			100 00
Permits & Surveys	20.00	" 1	M. Andre Arch			125 00
Excavating	75.00	" 1	City Permit			20 00
Foundation	200.00	" 1	Wisley Excavating			75 00
Brick & Stone	1500.00	" 1	Hartbui Foundation			300 00
Mason Labor	900.00	" 4	N. R. Ry Co Frt			71 50
Sand, Gravel & Lime	100.00	6	Payroll-Carpenters			80 00
Structural Iron		6	" Masons			43 00
Carpenter Labor	1500.00					
Lumber	1200.00					
Insulation	200.00					
Millwork	1400.00					
Roofing	350.00					
Heating	650.00					
Sheet Metal	200.00					
Plumbing	700.00					
Hdwe.—Rough	80.00					
Hdwe.—Finish	70.00					
Plastering	400.00					
Painting	800.00					
Electric Wiring	300.00					
Electric Fixtures	200.00					
Ins.	300.00					
	11,270.00					
O. H. @ 20%	2254.00					
Total Estimated Cost	13,524.00					
Add for Profit 10%	1,352.00					
Sold for	14,876.00					
Plus Extras:						
Freight	70.00					
Landscaping	300.00					
Total	15,246.00					

DATE	PAYMENTS RECEIVED	FOLIO	✓	CREDITS
Apr 10				500 00
" 16				700 00

REMARKS: (MONEY SAVING IDEAS AND SUGGESTIONS FOR FUTURE JOBS)

1 Story Brick Garage and office

Extra expense on foundation because it was necessary to go down 10 ft. to get a solid foundation.

MEMO ON COMPLETION OF JOB

CONTRACT PRICE OR TOTAL AMOUNT FROM JOB #

TOTAL EXPENSES

PROFIT ON JOB

Fig. 2 . . . FOR LARGE PROJECTS this form is recommended for summarizing job cost records, and additional similar sheets may be used if necessary to record all items. Every expense and all income pertaining to job should show up somewhere on this permanent record. Free use of Remarks column will help you bid more intelligently on future work.

ords and Cash Receipt accounts were discussed in previous articles.

For the larger jobs the form shown in *Fig. 2* should be used, and additional sheets may be added if necessary. On this form the estimate of detail job costs is entered at the left. Then all direct job expenses are entered in the record column, transferred from the Cash Disbursement Book and the Payroll Records. Here it can be seen why it is essential to assign a Job Number to each project for proper identification of accounts.

All receipts pertaining to the job are transferred from the Cash Receipts Book to the credit or right-hand column of the form. Note also there is provision on the page for Remarks, where unusual circumstances or job conditions can be explained for later reference to costs of this particular job.

Cost Recapping

On the back of the large Job Record Sheet is space for recapping all costs. By folding the reverse side over, the recaps can be directly compared with the estimate, as shown in *Fig. 3*. Thus, when the job is finished you can see how you came out on each item and you can tell just where you made or lost money. Bear in mind that the Overhead and Profit percentages shown in the illustration are for example only. Overhead is the percentage of your cost of being in business, and the exact amount is something only you can determine. The same goes for profit. You must decide, taking all factors, including risk and completion, the profit you wish to add to your estimated cost.

The recap sheet on the reverse side also gives you a job progress report, when kept up to date as it should be, where operations are such that certain items are completed during progress of work. Of course, it is realized that on many projects certain items or classifications are subject to recurring cost charges throughout the life of the job. Also, this form does not lend itself to progress cost comparisons on unit-price bid items. For job progress cost checks, it is suggested that work sheets be used, ruled up to accommodate the job at hand. From these work sheets the total cost of each item, after the item or the job is completed, can then be transferred to the master sheet for permanent record and overall analysis of the various costs.

For lump-sum items the work sheets should be set up on a percentage basis to permit cost analysis at periodic intervals. For example, if foundation excavation is figured at $10,000 total, and at the end of the first periodic check you estimate 35 percent of the foundation is complete, the cost to date should be set up along side 35 percent of $10,000, or $3,500 for comparison. Be sure to include all material costs, as well as labor cost.

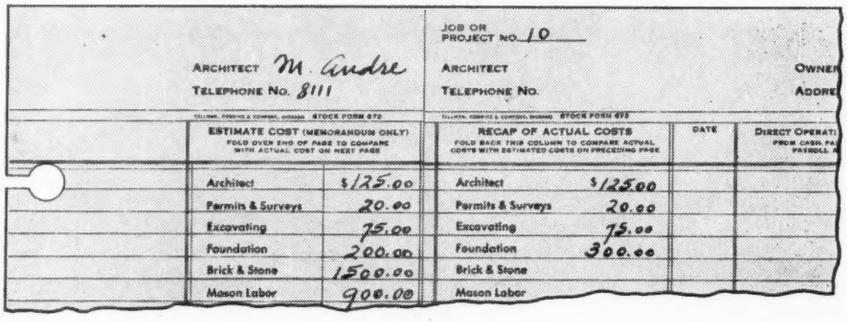
On unit-price items, the unit cost estimate (not bid price, for you have your overhead, equipment and profit charges in the bid) for the item should be set up on the work sheets for comparison with average cost per unit of that item at any periodic check time. Thus, if footing concrete has been estimated to cost $8.75 per cu. yd., the total amount spent on the item, divided by number of yards poured, will give an average cost of concrete to date. Comparison of this figure with $8.75 will instantly show you if you are ahead or behind of your estimated costs. Be sure, of course, to include both labor and materials of forms, too.

These work sheets are not intended to replace the master Job Record Sheet, but will supplement it. Many contractors work up a weekly, semi-monthly, or monthly report that shows progress quantities or percentages for the period and cumulative progress etc. to date on each item, as compared with period and cumulative costs on that item. Also, some contractors feel it is not necessary to include material costs on progress or work sheets, on the theory that such costs are fixed by job commitments, and that it is only labor costs that must be watched closely. In such cases, of course, the actual unit or item percentage labor cost must be compared only with the labor part of the estimated cost.

Job cost progress records are the barometer of your job. They keep you informed as to the financial weather of each part of the project, whether it be fair or stormy. The exact form in which you work up these all-important records is not so important, but it is most important to successful contracting that *some* kind of progressive cost record be kept, and kept up to date.

The sooner you learn that some part of the job or some item is getting out of line in cost, the quicker you can do something about it. Possibly nothing can be done about that particular item, maybe your bid was too low, or circumstances beyond your control have raised the cost. If such is the case, you at least *know* what is going on, and perhaps you can increase the efficiency of operations yet to be done to make up for the loss.

Remember that the master sheets, on the forms shown here, will give you the overall job picture as to costs, and, if you make use of the Remarks column you will have a constant reminder to aid in more intelligent bidding.



JOB OR PROJECT NO. 10

ARCHITECT M. Andre — TELEPHONE No. 8111

ARCHITECT — TELEPHONE No. — OWNER — ADDRE

STOCK FORM 672

ESTIMATE COST (MEMORANDUM ONLY) FOLD OVER END OF PAGE TO COMPARE WITH ACTUAL COST ON NEXT PAGE		RECAP OF ACTUAL COSTS FOLD BACK THIS COLUMN TO COMPARE ACTUAL COSTS WITH ESTIMATED COSTS ON PRECEDING PAGE		DATE	DIRECT OPERATI FROM CASH PA PAYROLL R
Architect	$125.00	Architect	$125.00		
Permits & Surveys	20.00	Permits & Surveys	20.00		
Excavating	75.00	Excavating	75.00		
Foundation	200.00	Foundation	300.00		
Brick & Stone	1500.00	Brick & Stone			
Mason Labor	900.00	Mason Labor			

Fig. 3 . . . REVERSE SIDE of big Job Ledger Sheet shown in Fig. 2 carries a column for recapping your total and final actual costs by items comparable to your breakdown of estimated costs. By folding page over recaps can be compared directly with estimates, as shown here. Left column here is front of sheet, right column is back of sheet folded over for comparison.

EDITOR'S NOTE: The cost accounting system and forms described in this series of articles may be obtained from Tallman, Robbins & Co., 314 W. Superior St., Chicago 10, Ill. The author, comptroller of the company, welcomes questions and comments on the subject.

FUSION PIERCING

With Oxygen Flame

Forms Blast Holes in Iron Ore

EXPERIMENTAL FUSION PIERCING RIG consists of portable oil-field drill with 30-ft. special blowpipe replacing the "kelly." Oxygen is supplied by cylinders on truck at left.

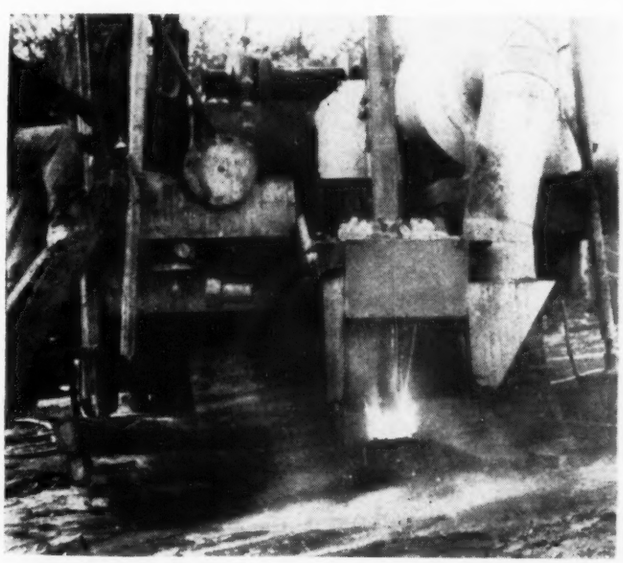
A NEW METHOD of making vertical blast holes in hard, low-grade iron ore, called fusion piercing, has recently been tested on the Mesabi Iron Range. Increases in drilling speed of ten times that of older methods have been reported.

In fusion piercing, a flame, produced by burning oxygen and a flux-bearing fuel in a special blowpipe, is directed against the surface of the rock. The high flame temperature, about 4,000 deg. F., causes some kinds of rock to spall or flake off. Flux in the fuel causes other kinds of rock to melt. Pressure of the burning gases forces the molten material past a water spray where it is quenched and broken up. In the quenching process water turns to steam and the steam helps the gases force the quenched material out of the hole. Fusion piercing is a patented process, and was developed by The Linde Air Products Co.

Equipment for commercial use is still in the development stage. For field tests a truck was equipped with a portable oil-field drill rig with the 30-ft. special blowpipe replacing the "kelly," and pumps, tanks, motors, and special recording instruments. A more compact and less complicated commercial machine is planned.

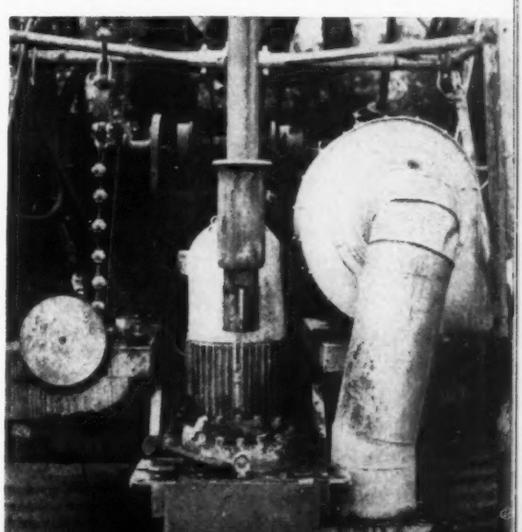
Field tests were made on Minnesota "taconite," an extremely hard, tough, abrasive, low-grade iron ore. Six-inch-dia. holes up to 30 ft. deep were fusion pierced at an average rate of 10 ft. per hr., with rates as high as 17 ft. per hr. for short periods. This compares with an average speed of about 1 ft. per hr. for drilling holes of similar diameter in this ore. The hot piercing flame produces stresses in the surrounding ore which cause better fragmentation during blasting, further reducing costs.

BLAST HOLE 6 in. in diameter and 30 ft. deep is formed in low-grade iron ore by special blowpipe which directs burning oxygen and flux-bearing fuel against rock surface.



BLOWPIPE carried by oil-well drill rig is withdrawn from hole after test run. Exhaust gas collector is shown at right.

WITHDRAWN FROM BLAST HOLE (below) end of blowpipe is here shown suspended from oil-well rig.



Grid Sheet Bracing System Holds Sides of Deep Cut

By CHARLES B. SPENCER
Vice-President,
Spencer, White & Prentis, Inc.
New York, N. Y.

BASEMENT CONSTRUCTION for a seven-story addition to the Gertz department store in Jamaica, New York, was complicated by shallow foundations of immediately-adjacent buildings and by the free-flowing characteristics of the sand through which the deep excavation had to be carried. Spencer, White & Prentis, Inc., New York engineers and contractors, installed concrete pier underpinning and a grid sheet system of braced steel piling and louvred sheeting that successfully prevented any subsidence of the surrounding buildings or streets.

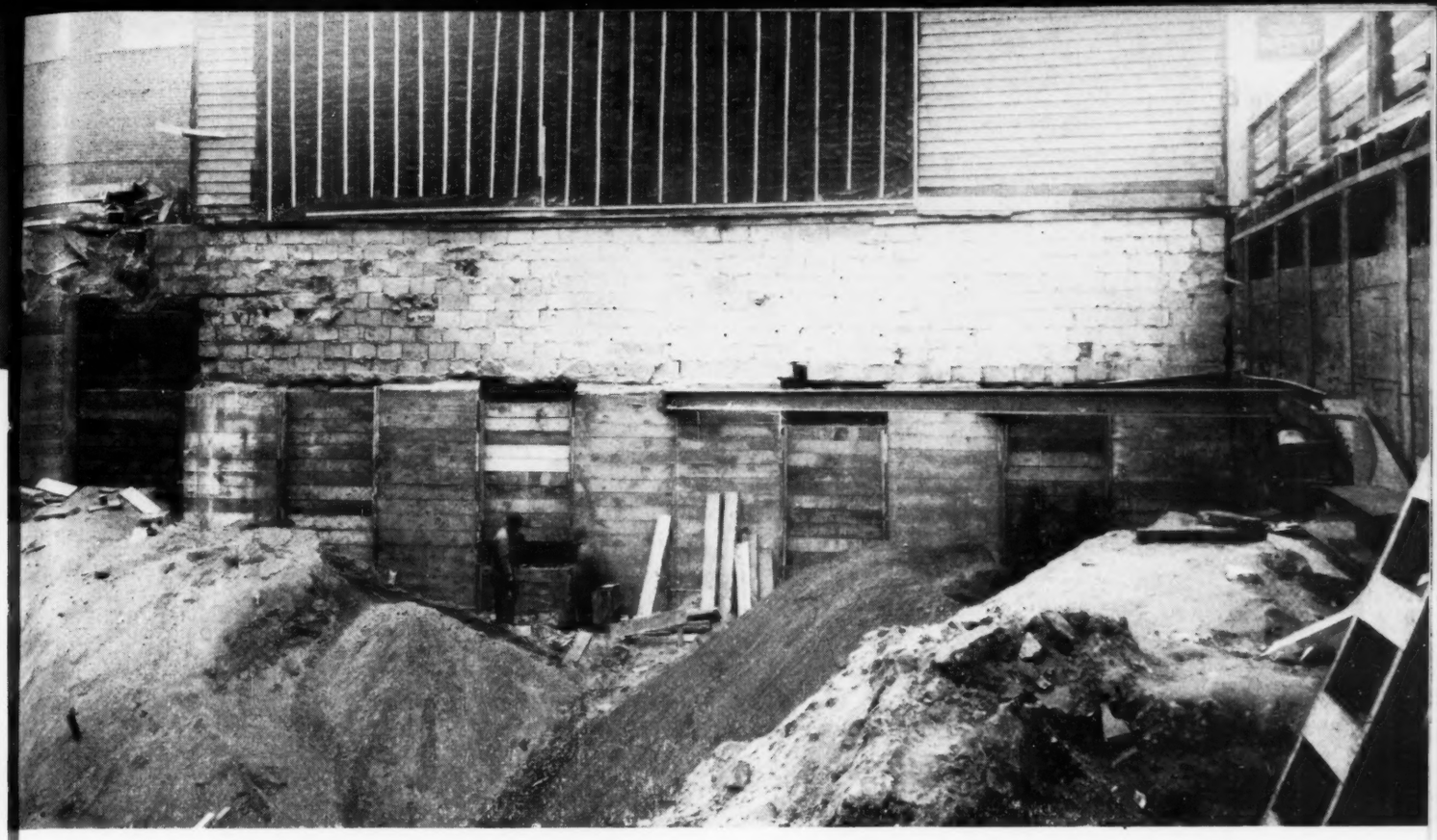
To provide for cellar, subcellar and the footings below, excavation had to be carried to about 35 ft. below the street through a dry sand of a consistency similar to that of granulated sugar. This material afforded excellent bearing—the footings being designed for 4 tons per sq. ft.—but the important problem was to do the necessary excavation without loss of ground under the streets at either end, a tall building on one side and two light buildings on the other.

Underpinning Placed While Clearing Site

All buildings were underpinned with concrete piers carried down to below the new subgrade. On one side the underpinning was continuous, since the loadings were sufficient to require the entire area for bearing. The buildings on the other side were only two stories in height, and here 50 percent underpinning was sufficient, 5-ft. gaps being left between 5-ft. piers. The space between the piers was sheeted with horizontal louvre boards wedged in between the concrete piers. A considerable portion of the underpinning was placed in advance, working from existing cellars during demolition of the structures on the building site, in order to permit general excavation as soon as the wrecking was finished.

Both streets and the yards between the light buildings were maintained by a grid sheet system of 10-in. H-piles driven below subgrade with horizontal louvre boards set on the line of the back of the new foundation walls. The piles, as soldier beams, were driven as soon as a power shovel had excavated wrecking debris and old walls, and the sheeting between the beams was immediately carried to a depth of 10 ft., which was about the limit of the strength of the beams as cantilevers. Excavation was then carried to subgrade in the center of the lot before the installation of any bracing. Several interior foundations were poured, and these footings were used as heels for

SOLDIER BEAMS are driven on 6-ft. centers to support 3-in. louvre board sheeting. Grid sheet system will prevent loss of dry sand from beneath street bordering excavation for seven-story store.

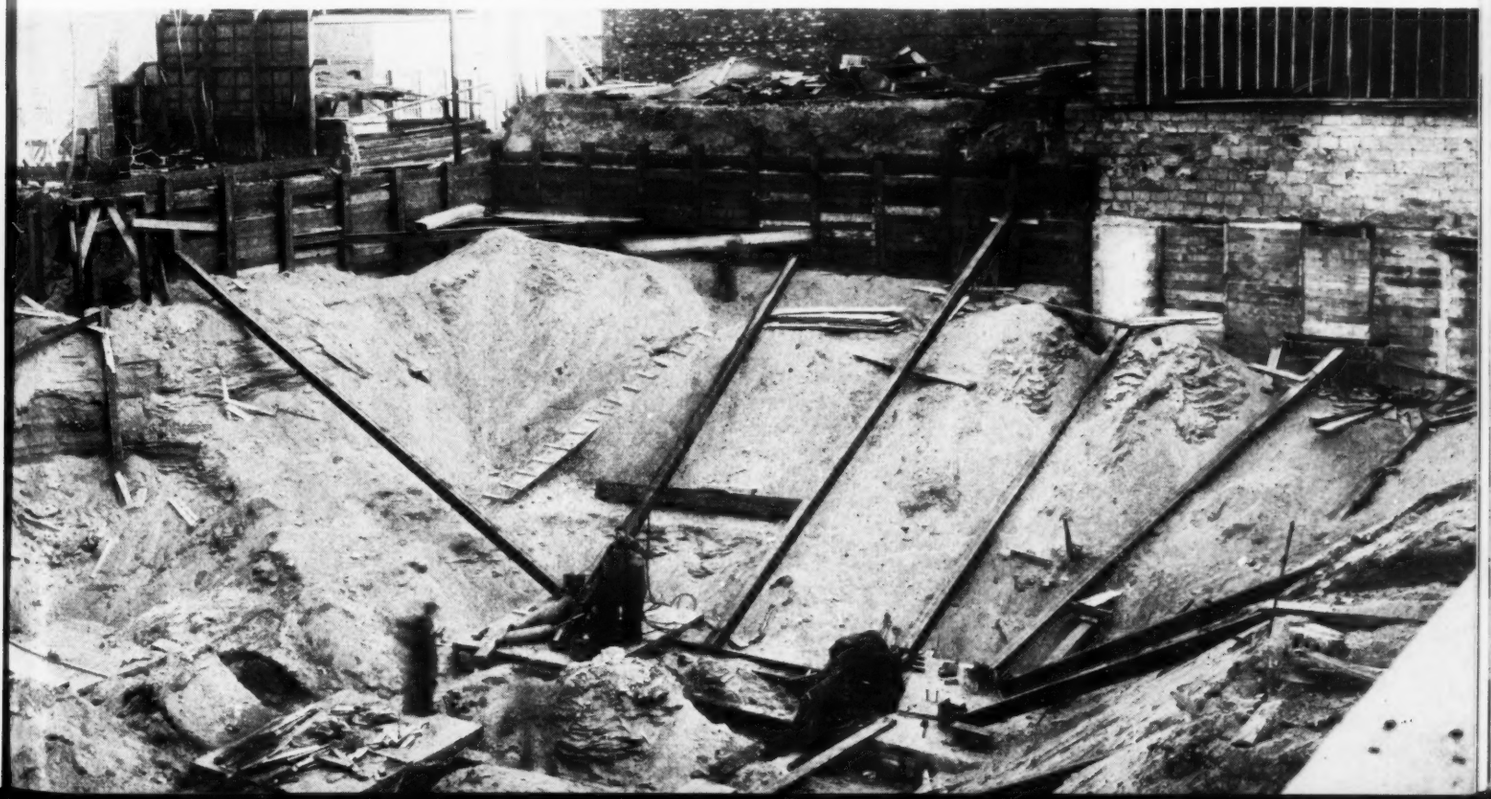


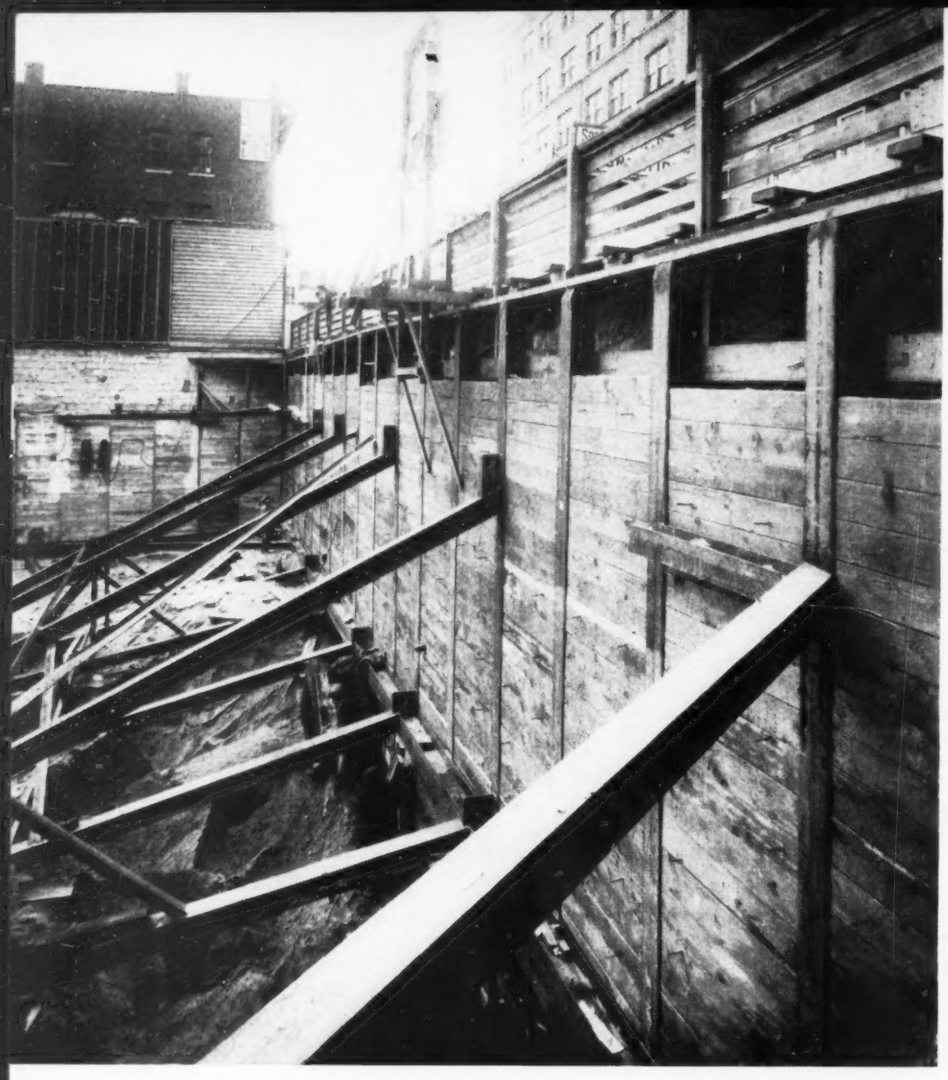
ALTERNATING PIT underpinning supports light building. Note double center pier taking thrust of diagonal bracing holding street at right. Men are setting horizontal louvre board sheeting between concrete piers.

bracing placed to support both the soldier beams and the underpinning. Vertical beams were set in the foundation pours to take the thrust of inclined shores, while horizontal beams between the footings tied them together to prevent any movement of the bracing system or of the foundations against which it reacted.

With the top line of bracing in place, removal of the berms along the streets was continued by clamshells working over and between the shores, and the horizontal louvre board sheeting was continually carried down along with the excavation. To eliminate basement wall form bracing, anchors for form ties were set in the sheeting before it was placed. When the

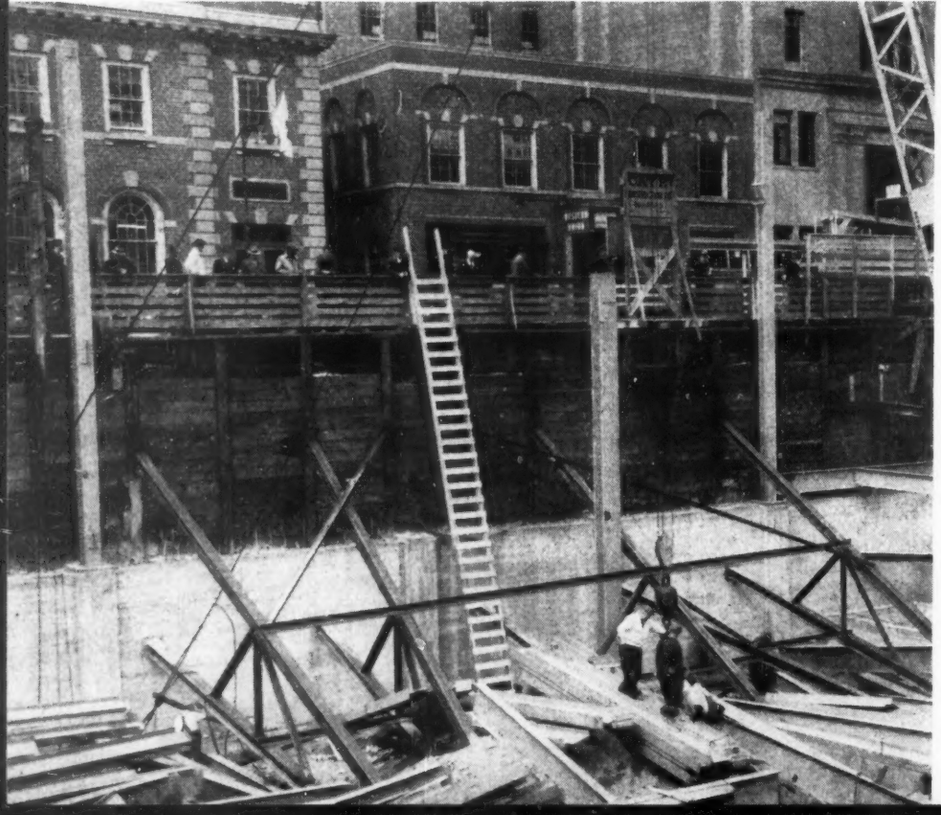
RAKER BRACES (below) support sheeting system and underpinning while berm along perimeter of building site is excavated. Shores react against stub beams imbedded in cross-braced interior column footings.





LOWER LINE OF WALES and shores brace grid sheet as excavation deepens. Note upper wale welded to outside flanges of soldier beams. Anchors set in louvre boards before installation serve as form ties to eliminate bracing of basement wall forms.

BOTTOM WALE is imbedded in lower street wall and structural steel is erected. All-welded bracing system has been carefully laid out to clear permanent building frame and will be burned off after two lower tiers of steel have been placed.



berms had been removed to a depth of 20 ft., a second line of bracing was placed, generally against the same foundations that supported the upper line. Angle cross-bracing welded near the mid-points of the rakers of both bracing sets reduced their unsupported lengths. Since all the soldier beams had been driven 8 to 10 ft. below the deepest excavation alongside, the general excavation could now be completed together with all excavation for footings. The strength of the soldier beams was sufficient to span from the lower wale to subgrade.

An interesting feature of the bracing system was placing the top wale on both streets outside the soldier beams and welding them to permit the 16-in. thick upper portions of the street walls to be poured continuously. All the beams supporting the street banks were put into initial compression by hydraulic jacks, since it was felt that otherwise the elastic compression of the members, together with the slack in the system, might involve damaging movements in the soil. Furthermore, it had been observed on other operations that bank pressures were considerably less when even minor movements in the soil were prevented.

Alternate Methods Rejected

It is believed that no other method of bank protection could have produced an equal result. Steel sheetpiling was difficult to obtain and far more expensive, and driving it through the coarse sand would have produced vibrations damaging to adjoining structures. Wood sheetpiling would have involved serious loss of ground during installation and required backfill behind the wall, the consolidation of which might have produced settling in the streets. The methods used, combined with extreme care in installation, resulted in complete success. No settlement was noted in any of the buildings underpinned, nor was there any measurable movement of the banks on either street.

Architect for the building was the New York firm of DeYoung, Moscowitz & Rosenberg, with Elwyn E. Seelye & Co., New York, consultants for foundation design. General contractor was Caye Construction Co., Brooklyn, and the work described was done by Spencer, White & Prentis, Inc., N.Y.

LEGAL ADVENTURES of TRACTOR CONN

By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

This series of articles, dealing with the Legal Adventures of Tractor Conn, a typical contractor anywhere in the United States, explains some of these legal points in plain language for the contractor. Each one is based on an actual decision of an American Court.

The Case of the Neglected Search

"All such work shall be carried on by the said Tractor Conn in strict compliance with the building laws, regulations and ordinances in force at the time and place when and where the building is located," a certain building contract provided. After so much work had been done that it was practically impossible to remedy the defect, it was discovered that the building did not comply with the law respecting fire escapes.

"You've broken your contract," the owner pointed out.

"I didn't know what the building laws were, as this is the first building I have put up in this city, and I hope it will be the last," Tractor Conn averred.

"After signing a contract like that, it was your duty to ascertain what the building laws were. Ignorance of the law is no excuse, as you may have heard."

"No, it was your duty to tell me."

The gist of the foregoing dispute came before the New York Courts, and the decision was in favor of the owner, on the ground that when a person signs a contract to comply with certain laws, it is his duty to ascertain what those laws are.

The Case of the Misleading Data

NOTE: The following "adventure" is in answer to an inquiry from a Construction Methods reader.

Tractor Conn was boring into an excavating contract. He found that he was going in the hole in more ways than one and hustled to his attorney's office.

"Just what are the facts?" the attorney demanded.

"The main fact is I'm losing money, but fast," Tractor Conn explained. "The owner supplied us with bidding drawings with figures showing the sub-surface conditions and the quantity of excavating necessary to complete the contract. I was the unlucky bidder."

"You mean you got the contract?"

"Yes. I signed it and started boring yesterday. Now I find that his figures were extremely misleading. The sub-surface conditions are about 70 percent as favorable as his figures indicated. Actual excavating will overrun his figures at least 25 percent. The total cost will run at least 33 percent more than the estimate on which I based my bid," Conn stated.

"The owner's drawings and figures would be what we lawyers call a 'bill of quantities.' "

"Never heard that one before," Conn admitted.

"The best definition is an English one found in 3 Hals. L. Eng. 163 par. 320, which defines 'bills of quantities' as 'the name given to a detailed statement of the different items of work, labor, and materials which it is estimated will be required for the proposed work. The bills of quantities are usually split up into several bills, such as the carpenters' bills, the mason's bill, etc., and are provided with a blank money column for the builder to fill up, and by the addition of the sums filled in the builder can arrive at the amount of his tender.' "

"That's a pretty discouraging book you're reading from," Conn demurred.

"The worst is yet to come," the attorney explained. "The same book on the same page says that, 'As a preliminary to the execution of contracts for the construction of important works, an estimate is frequently made of the amount of materials to be furnished, to be submitted to prospective competitive bidders for the work. The contract, when entered

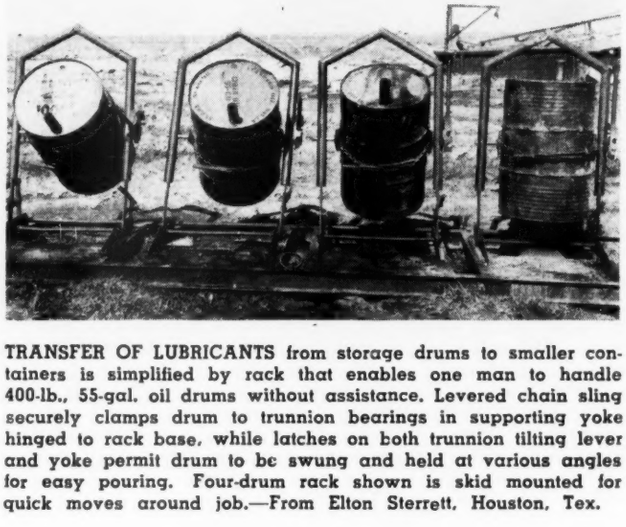
(Continued on page 159)

More Legal Adventures of Tractor Conn Next Month

HOW They Did It

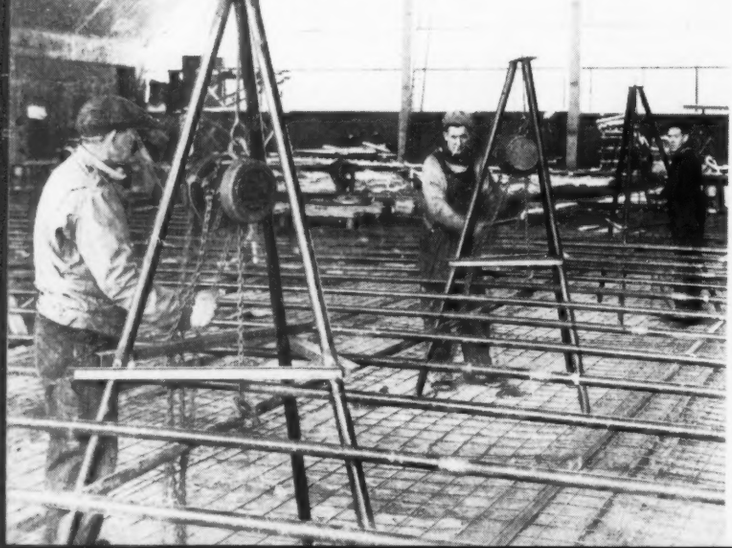
CONSTRUCTION DETAILS For Superintendents and Foremen

BORROWED FROM ANOTHER RIG, 30-ft. extension was added to standard 75-ft. boom on Bay City 20-ton CraneMobile by Kenwood Erection Co., Chicago, to place 3-ton top section on high coal unloading tower at Havana, Ill. R. F Pontious, vice-president of Kenwood, reports he doesn't recommend 115-ft. boom as steady diet for truck cranes, but this scheme worked without mishap. After extension was made on ground, another crane raised long boom until truck crane's boom lines could take hold. Extended boom operated at 30-ft. radius.

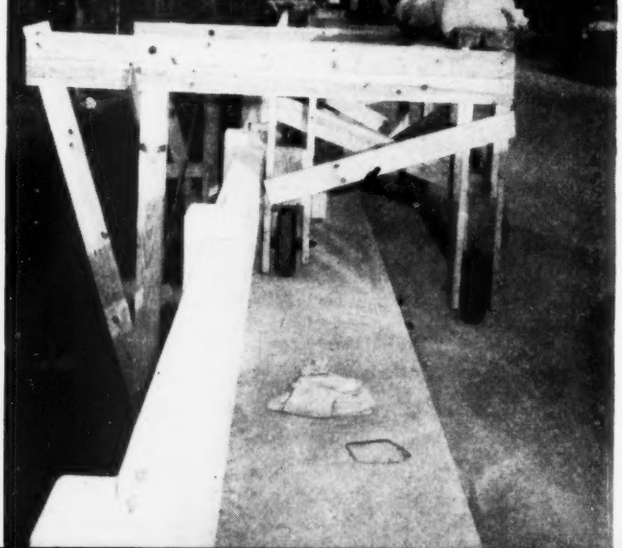


TRANSFER OF LUBRICANTS from storage drums to smaller containers is simplified by rack that enables one man to handle 400-lb., 55-gal. oil drums without assistance. Levered chain sling securely clamps drum to trunnion bearings in supporting yoke hinged to rack base, while latches on both trunnion tilting lever and yoke permit drum to be swung and held at various angles for easy pouring. Four-drum rack shown is skid mounted for quick moves around job.—From Elton Sterrett, Houston, Tex.

CHAIN HOISTS (below) suspended from welded tripod frames raise 1¼-in. cold bent, wrought iron pipes for welding into sinuous radiant heating coils for General Electric Co. hangar at Schenectady, N. Y. Tipped angle supports placed over mesh on 1½-in. rough concrete slab will position heating coil in 6½-in. finished floor slab. General and heating contractors for concrete hangar project were, respectively, Corbetta Construction Co. and Heating Maintenance Corp., both of New York City.

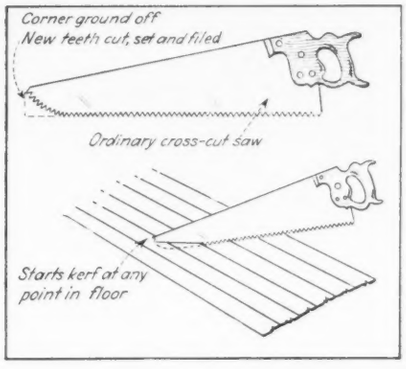


STRIPPING SIDEWALK FORMS and rubbing facia concrete on Pee Dee River bridge in South Carolina by C. Y. Thomason Co., Greenwood, S. C., was expedited by four rolling scaffolds (below). Mounted on three sets of tires, scaffold can be moved by one man. Rig clears hauling equipment using roadway. Sand ballast counteracts scaffold load. Built under direction of Samuel Blackmon, Jr., superintendent, each scaffold cost $75.



CHERRY PICKER, built in shops of Barrett & Hilp Construction Co., San Francisco, to handle concrete form panels on housing project, is capable of safely lifting up to 3 tons. It is mounted on four-wheel drive chassis. Salvaged swinging gears enable crane to turn through 180 deg. When used with trailer, rig can load material on to trailer, haul it to job, unload it and help on erection work.

BACKSCRATCHER (above), weighing 2,600 lb. and hanging from 60-ft. boom of Link-Belt 1¾-yd. dragline (below), loosens cemented sand and gravel in 125-ft. bank for shovel loading at Consolidated Rock Products Co. pit at Irwindale, Calif. Scarifier consists of 22-in. manganese steel teeth set in 4x5-ft. cast steel frame.



HAND SAW is adapted for use both for ordinary sawing and for starting kerfs in unbroken floor by grinding off point or corner to round shape and then filing new teeth in that part of blade. — From Andrew Vena, Philadelphia.

BULLDOZER IN REVERSE is large lister designed by L. M. **ARMSTRONG**, project engineer on U. S. Bureau of Reclamation's Gila project in Arizona for cutting farm-turnouts from side of lateral irrigation ditches. Rig is mounted on standard dozer frame.

THE CLOSED SHOP

Key to Labor Monopoly

IF THE PEOPLE of the United States are to loosen the monopoly control now exercised by some segments of union labor and recapture the power to control their own economic and political destiny, they must come to grips with the problem of the closed shop. A satisfactory solution of that problem is as vital to the interests of the wage earner, who should be fully protected in his right to organize and bargain collectively through representatives of his own choosing, as it is vital to the interests of the nation as a whole.

By the closed shop, which unfortunately is a term that seems to shed more heat than light, I mean any shop in which the worker must make his peace with a union in order to have a job. There are approximately 13½ million union members in the United States. Of these about 10 million are governed by arrangements calling for "closed" shops, union shops, maintenance of membership provisions and similar devices which make good standing in a union a condition to holding a job.

Such arrangements raise serious issues about what is commonly presumed to be the basic American right to work. Also, closed shop arrangements lie at the root of the dominant economic power now exercised by some labor leaders.

The problem of reducing the power of these labor leaders to proportions that make it safe for democracy is the age-old problem of monopoly. In an earlier era this problem was created largely by businessmen who sought to escape the restraints of competition by combinations or agreements to control prices and production. Such efforts are still attempted and must be curbed by law.

Union Labor Monopoly

But, after more than a decade during which a monopoly position for organized labor has been aggressively promoted by the federal government, the major monopolists today are those labor leaders who wield the power of enormous nationwide unions. About 90% of the soft coal miners do the bidding of John L. Lewis. A like percentage of the auto workers are represented by the United Automobile Workers of the C. I. O. About 80% of the production workers in steel are members of the United Steel Workers, C. I. O. No single corporation has more than a fraction of the economic power that is concentrated in these unions. And if corporations were to combine their power to cope effectively with that of these union monopolies they would unquestionably find themselves charged with violating the federal antitrust laws.

In its national sweep, the monopoly power of unions rests largely on their exemption from the federal antitrust laws. My previous editorial in this series (the 53rd) discussed the desirability of removing that exemption. The local roots of this monopoly power are often embedded in closed shop arrangements.

Closed Shop in Coal

An illuminating case in point is provided by the United Mine Workers, whose leader John L. Lewis has graciously given the country a 3½-month reprieve from "the hysteria and frenzy of an economic crisis," as he himself termed it. During that latest crisis the dispatches from the soft coal fields reported that the miners were standing behind John L. Lewis almost to a man. And the implication usually was that the driving forces of the strike were loyalty to Lewis and the prospect of economic gain.

Underlying that performance, however, and basic to it was an agreement in the soft coal fields providing that "as a condition of employment all employees shall be members of the United Mine Workers." Hence to hold a job in 90% of the soft coal industry which is governed by contracts with the United Mine Workers, a miner must not offend the union. To avoid offense the union member must even be careful in criticising what his union

does. *Suspension from the union for six months, and hence from the right to hold a job,* is the penalty imposed by the United Mine Workers constitution for circulating a statement "wrongfully condemning any decision rendered by any officer of the organization."

The willingness of the miners to follow Lewis until the country froze over was not, of course, exclusively a product of the agreement limiting jobs in the coal fields to union members of good standing. Some of it originated in bad handling of employee relations in the coal fields in years gone by. But the fact remains that Lewis' soft coal monopoly has as one of its principal foundations an agreement which gives the United Mine Workers a job-or-no-job hold on 90% of the soft coal miners.

In its extreme form, the closed shop not only makes union membership a condition of employment but narrowly limits the numbers admitted to union membership and hence to the opportunity to work. In this way it is used to enforce restriction of output and working rules which would never stand up under free competition.

Fair Dealing

The closed shop raises major issues of personal freedom and fair dealing between individuals. As matters now stand, closed shop agreements require employers to discharge workers who lose their good standing in the unions involved. At the same time they frequently impose no requirement on unions to grant membership to law abiding and technically qualified persons. Many unions with closed shop agreements refuse to grant membership on the basis of competence. Thus, qualified workers are denied a fair chance to hold a job.

In its dealings with the closed shop issue the federal government has been pushed into a self-contradictory position. The National Labor Relations Act (the Wagner Act) provides, and properly, that "employees shall have the right . . . to bargain collectively through representatives of their own choosing." In furtherance of that basic proposition, the Wagner Act also provides that "It shall be an unfair labor practice for an employer . . . by discrimination in regard to hire or tenure of employment to encourage or discourage membership in any labor organization . . ." Standing alone, the provision would clearly outlaw the closed shop.

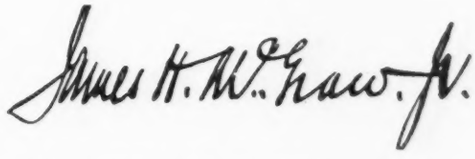
But then, to favor the closed shop, the Wagner Act turns right around and provides that "nothing in this Act . . . shall preclude an employer from making an agreement with a labor organization . . . to require, as a condition of employment, membership therein," provided that certain conditions of representation are fulfilled. This places the National Labor Relations Board in the impossible position of trying to administer a law which simultaneously points in opposite directions.

In successfully contending that there should be no closed shop arrangements on the railroads, the late Joseph Eastman, Federal Co-ordinator of Transportation, said, "If genuine freedom of choice is to be the basis of labor relations under the Railway Labor Act, as it should be, then the yellow dog contract and its corollary, the closed shop . . . have no place in the picture." The so-called yellow dog contract, which requires a worker to agree not to join a union as a condition of employment, has long since been outlawed.

At one time the closed shop was defended as a protective device for feeble young unions struggling against predatory employers. But a mere glance over the current economic scene discloses that the time when that argument was supported by the facts is past. Now it is the labor leaders who frequently exercise decisive economic power.

At elections in November three more states, Arizona, Nebraska and South Dakota, passed constitutional amendments outlawing the closed shop. In doing so, they joined six other states, which, in one way or another, have restricted the closed shop. The South Dakota amendment presented the basic issue created by the closed shop in simple and direct terms when it declared that "The right of persons to work shall not be denied or abridged on account of membership or non-membership in any labor union, or labor organization."

That issue must be squarely faced by the new Congress if its first order of business, the labor crisis, is to be resolved.



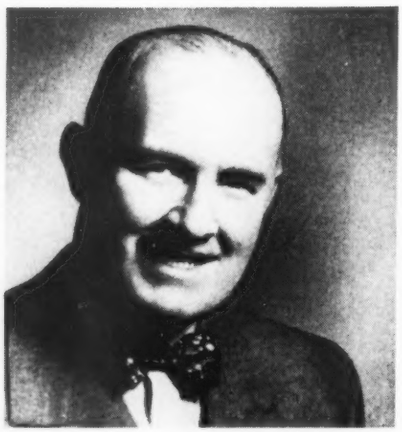
President McGraw-Hill Publishing Company, Inc.

THIS IS THE 54TH OF A SERIES

Present and Accounted For... T

NEW PRESIDENT of Carolina Branch, Associated General Contractors, is C. Y. THOMASON, head of his own construction firm at Greenwood, S. C.

AFTER 57 YEARS' ASSOCIATION with Stone & Webster, Inc., EDWIN S. WEBSTER (left), who formed partnership with Charles A. Stone in 1889, has retired as chairman of board. He will continue his directorships in company and its subsidiaries and maintain his office in Boston, where he will be available for consultation. Succeeding him as chairman is WILLIAM T. CRAWFORD (right) who has served as executive vice-president for last 10 years.



ELECTED PRESIDENT of American Road Builders' Association, J. T. CALLAWAY will assume his new office at Association's annual meeting in Chicago Feb. 17-21. For last year Callaway, assistant to vice-president of Goodyear Tire & Rubber Co., with headquarters in Chicago, has been head of A.R.B.A. Manufacturers' Division.

MEDAL OF FREEDOM is pinned on CLIFFORD S. STRIKE (right), president of F. H. McGraw & Co., Hartford, Conn., by MAJ. GEN. JAMES A. VAN FLEET, deputy commander, First Army. One of highest awards given to civilian, medal was presented to Mr. Strike for services in Germany as United States representative, Economics Division, Quadripartite Valuation Committee.

NAMED COUNTY ENGINEER for Cuyahoga County, Ohio, is A. S. PORTER (below), who was formerly chief deputy in engineer's office and recently returned to that post after five years in charge of dry dock construction in Navy's Civil Engineer Corps.

NEWLY CREATED POST of assistant to president of James Stewart & Co., Inc., engineers and contractors, is filled by JAMES M. JENSEN (below), who has been with company for 31 years.

NEW DIVISION OFFICE of Public Roads Administration has been established in Philippines, with headquaters in Manila. In charge is FRANCIS C. TURNER (below).

.. TWO PAGES OF PERSONALITIES

FROM CONSTRUCTION TO CRIME is literary route followed by PATRICIA McGERR, assistant editor of "Construction Methods," whose first novel, "Pick Your Victim," was Crime Club selection for December. With her at party launching sale of book in Washington are (left to right): KALLE JUTILA, Finnish minister to United States; A. N. CARTER, "Construction Methods' " Washington Editor, and CHARLES M. UPHAM, engineer-director, American Road Builders' Association.

ELECTED PRESIDENT and director of Merritt-Chapman & Scott Corp., of New York, is FREDERIC E. LYFORD, who joined organization in 1944. In 1943 he served as chief of American Railroad Mission to Portuguese railroads in Africa for U. S. Office of Economic Warfare.

FOUR NEW GOVERNMENT AGENCIES for liquidation of remaining government wartime controls are headed by (left to right): FRANK P. CREEDON, new housing expediter; JOHN R. STEELMAN, now assistant to President for coordination of agencies and policies; MAJ. GEN. PHILIP B. FLEMING, chief of new Office of Temporary Controls, and RAYMOND M. FOLEY, new head of National Housing Administration.

Press Association Photo

HONORARY MEMBERSHIP in American Society of Civil Engineers will be conferred on A. P. GREENSFELDER, chairman, Fruin-Colnon Contracting Co., St. Louis, at Society's annual meeting in New York, Jan. 15-18.

ON INSPECTION TOUR of Fontana, Calif., plant of Kaiser Co., Inc., are (left to right, below), J. L. ASHBY, general sales manager for company; T. R. MULLEN, newly elected president of American Institute of Steel Construction and president of Lehigh Structural Steel Co., New York, and FRANCIS M. RICH, Kaiser vice-president in charge of operations.

→

TRANSFERRED TO WASHINGTON as chief engineer, Office of the Chief of Engineers, U. S. Army, is R. W. STUCK, formerly chief of engineering division, South Atlantic Engineer Division, Atlanta, Ga.

Step by Step by FIELD METHODS

Watersphere Takes Form of Golf Ball on Tee

DESIGNED TO SIMULATE a giant golf ball on a tall red tee, a 40,000-gal. welded steel watersphere supported on a 65-ft. high tubular column has been erected by a small tank-building crew of the Chicago Bridge & Iron Co. for the Tam O'Shanter Country Club, Chicago, scene of George S. May's annual All-American golf tournaments.

Accompanying photographs show the erection steps better than words can tell them. Overall height of the structure is 86 ft.

Total steel, including accessories such as anchor bolts and ladder, amounted to nearly 20 tons. Plate thickness for the conical base is 9/32 in. in the lower ring and 13/32 in. in the upper ring; for the central riser, ½ in. in the lower section and 7/16 in. in the upper part; and for the sphere, 5/16 in. in the lower half and ¼ in. in the upper half. The central riser, which contains a ladder, extends upward through the sphere as an access tube. Also inside the column is a 6-in. water pipe. Diameter of the sphere is 22 ft. 10 in.

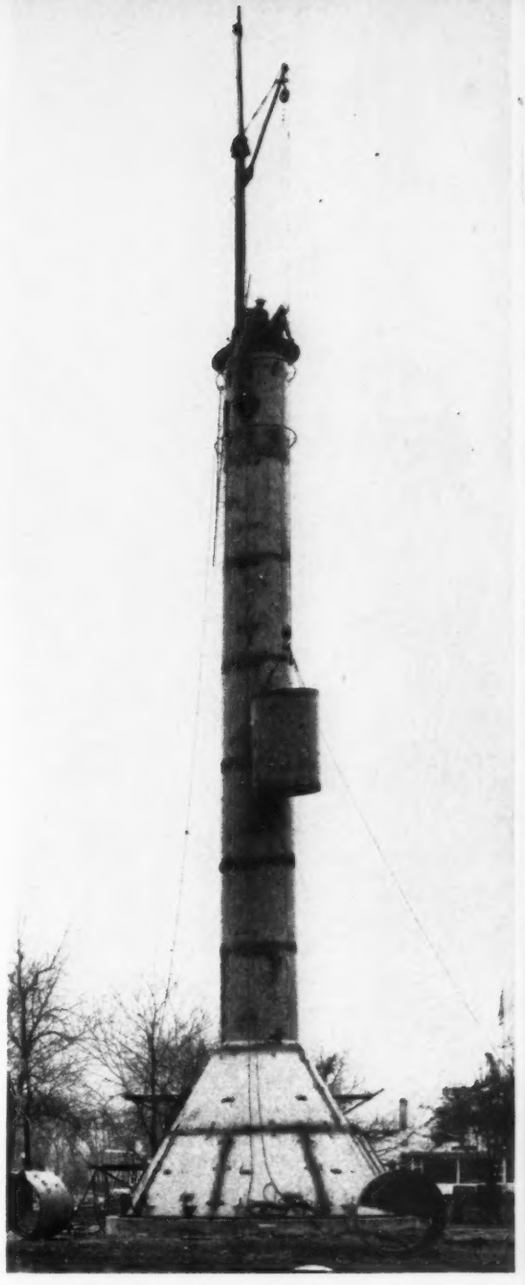
All plates are joined by butt-welded V-joints, made with shielded carbon steel electrodes arced by 200-amp. portable gasoline-engine generators. Two beads were sufficient for the ¼-in. plate, one of them being a backup weld placed on the inside after peening. Other plates required two outside beads and a backup bead.

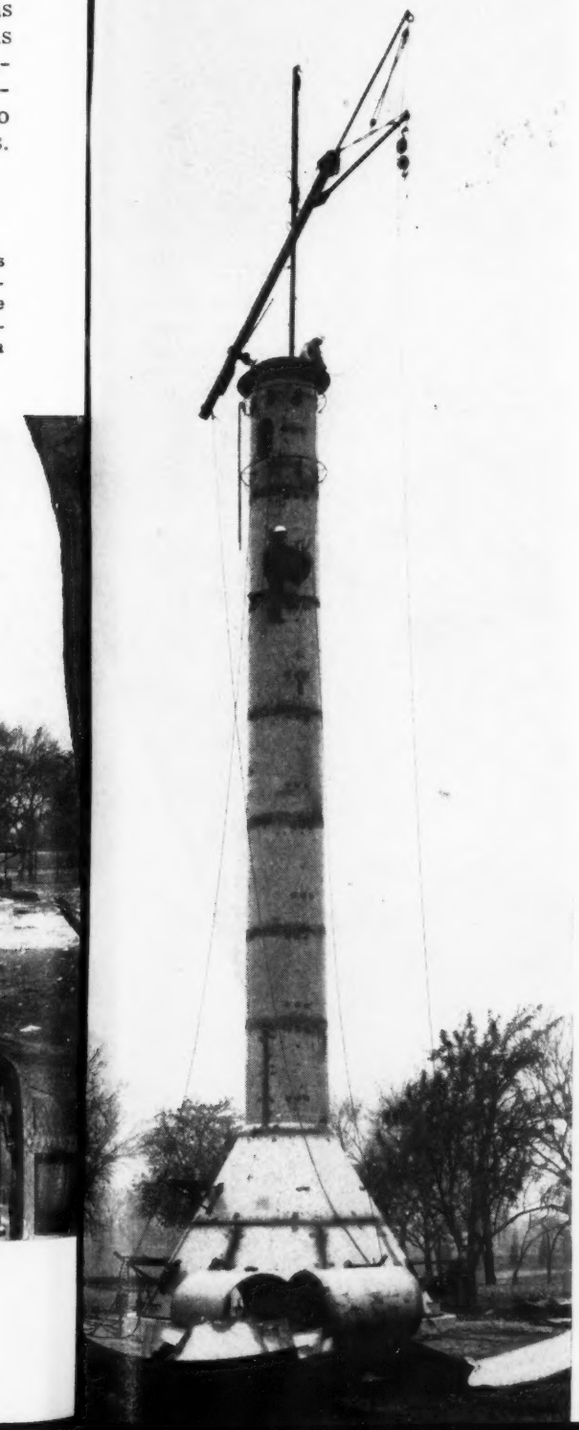
Erection procedure was typical for watersphere construction as practiced today. No effort was made to achieve an assembly record. Weather caused no undue delays. Some days, as usual, were too windy for hoisting plate sections. Erection took 25 calendar days.

1 GIN-POLE BOOM DERRICK (below) sets lower ring of shop-fabricated plates for conical base 18 ft. in diameter on 21-ft. circular footing. Each of eight base plates is anchored to concrete foundation wall by two 1½-in. bolts.

2 DRAW-UP PLATES equipped with lock screws align plates of first section of central riser for welding. In left foreground is shop-fabricated riser section on which watersphere will rest; section is reinforced to carry sphere and support interior ladder. Also in foreground is gasoline-powered hoist which operates gin-pole boom derrick.

TANKBUILDER crew comprises five men: (Left to right) DELMAR SOEHREN, ROBERT ELLIS, HOMER JOHNSTON, GLENN JACKMAN, foreman, and BERNARD KIBLER.





3 JUMP TO NEXT POSITION is made by gin-pole boom derrick with aid of interior gin pole while tankbuilder detaches stub-base for gin-pole mast from outside of riser column to move it up to next section.

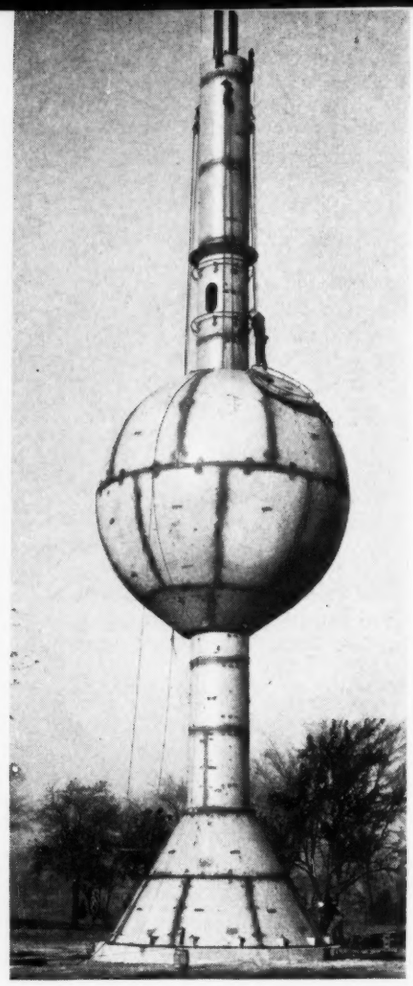
4 SEATED ON BOLTED BASE at higher position, gin-pole boom derrick raises shop-fabricated riser section for first lift of access tube inside watersphere.

5 SUPPORTED BY CONICAL BASE, watersphere (below) is assembled around riser. V-butt joints of molded plate sections for watersphere, at left, are first locked in alignment with draw-up plates and are then laced with welded tierods before welder begins placing first bead. At right, tank-builder is cleaning surface of welded joint with air grinder.

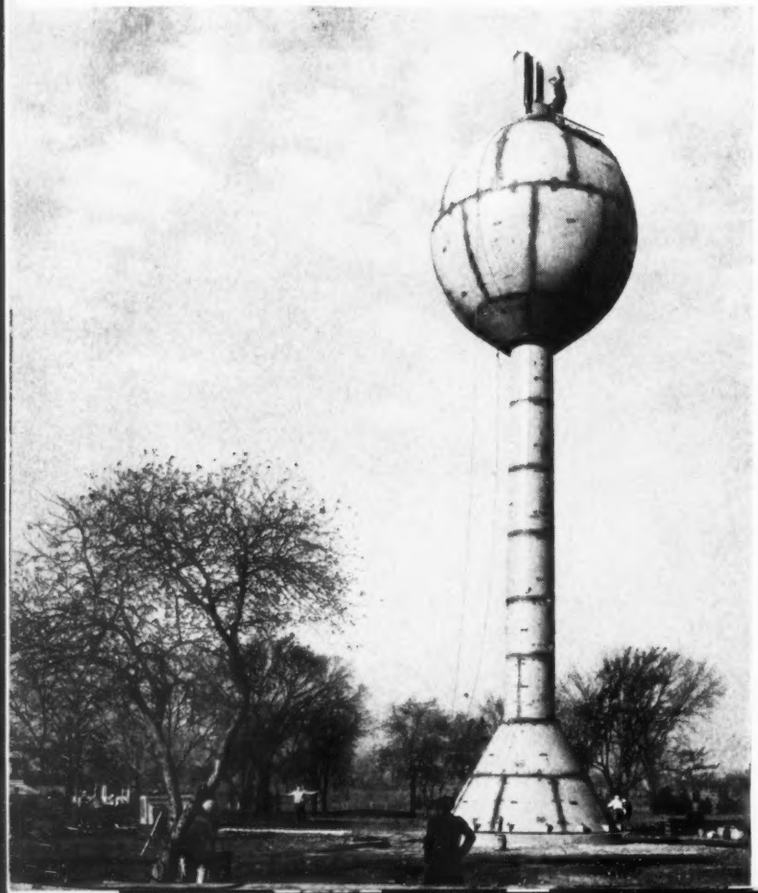
(Continued on next page)

Step by Step FIELD METHODS ... Continued

6 THREE-PLATE SEGMENT of watersphere rises into position suspended by shackled bridle from load falls of gin-pole boom derrick. Operator of gasoline-engine unit at right controls hoisting speed.



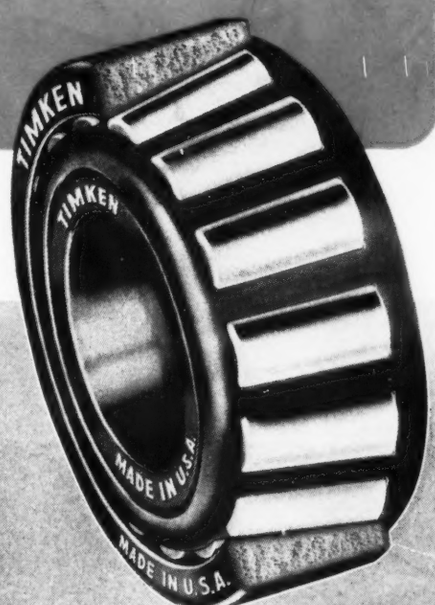
7 POWER HOIST AND TWO HAND-CRANK WINDLASSES on ground raise assembled watersphere up central riser on three sets of hoisting falls. At top of central riser is half-cylindrical section to carry interior ladder up to manhole opening in top surface of watersphere. Manhole cover rides upward with sphere. Conical flange attached to central riser marks connection of watersphere to column.



8 AS WATERSPHERE RISES within 10 ft. of final position, tankbuilder on top signals hoisting crews while guiding sphere past welded guard rings and conical flange on central riser.

9 ELEVATED TO FINAL POSITION, with bottom plates tangential to conical flange on central riser, watersphere is ready for welded connection at bottom and closure at top to resemble huge golf ball on tee.

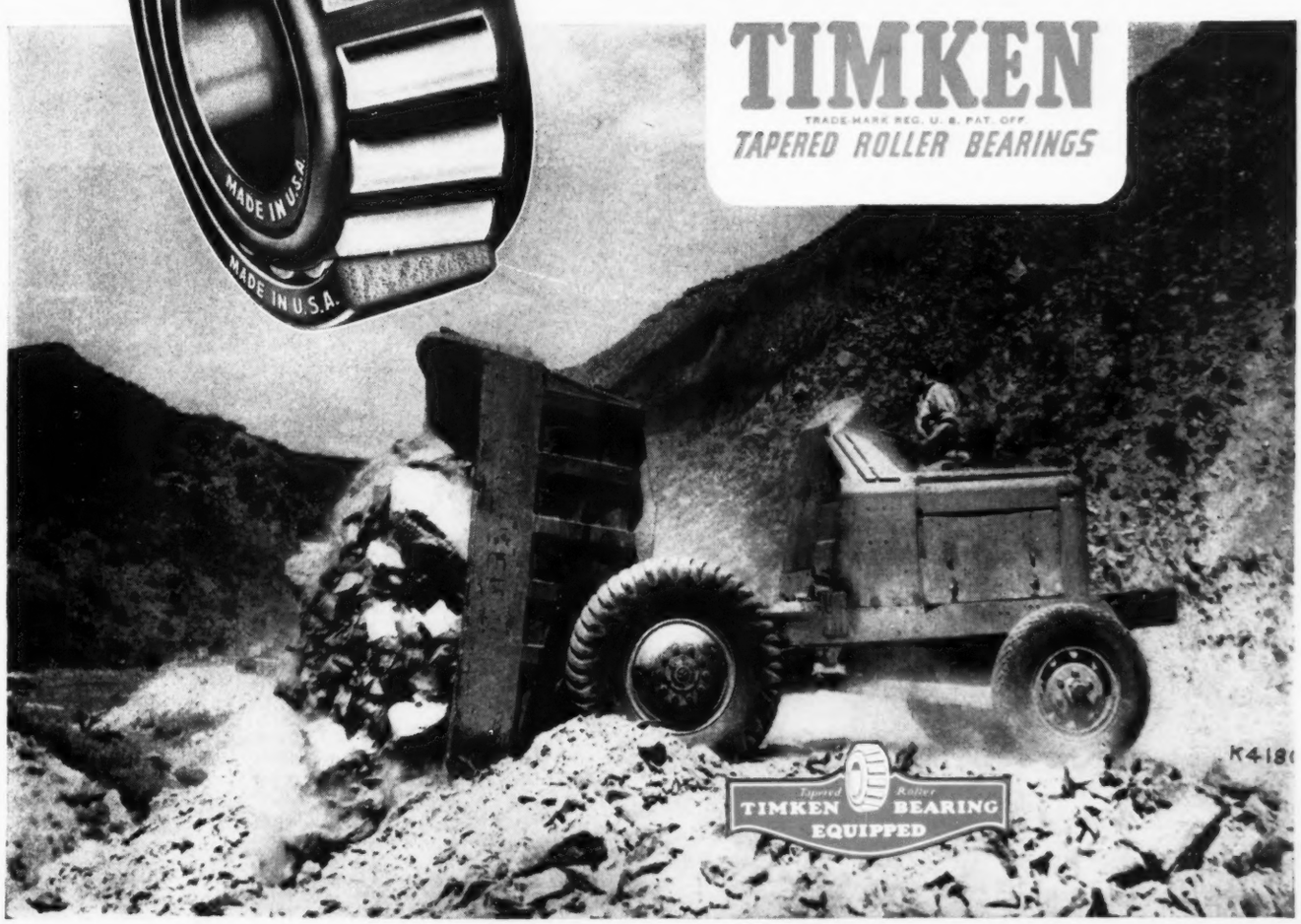
DUMPTOR *does it Quicker* ON TIMKEN BEARINGS



At no time in the long progressive history of the construction industry has dirt been moved as fast and as economically as it is being moved today. The constant trend to higher and higher speeds in dirt-moving equipment is emphasized in the Koehring Dumptor shown in the photograph below.

From its inception years ago, the Dumptor has been equipped with Timken Tapered Roller Bearings. Today's model has them on the axles and on all shafts of the transmission. In these important positions their ability to eliminate friction; to carry radial, thrust and combined loads; and to hold moving parts in correct and constant alignment; means better performance, lower operating and maintenance costs and longer equipment life.

To be sure of getting Timken Bearing advantages in your machines, look for the trademark "TIMKEN" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.



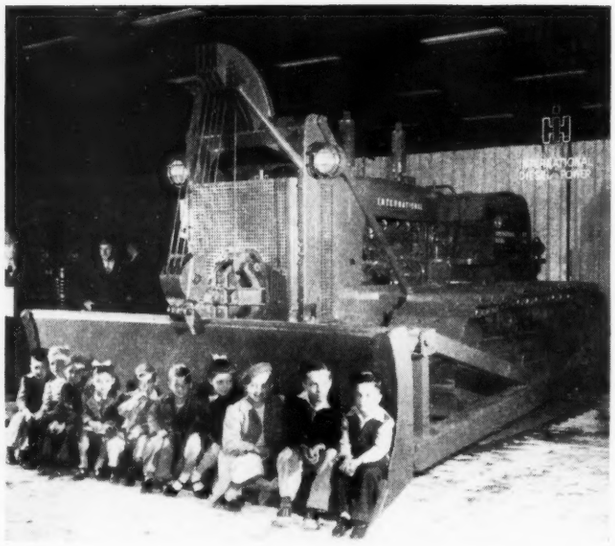
JOB oddities

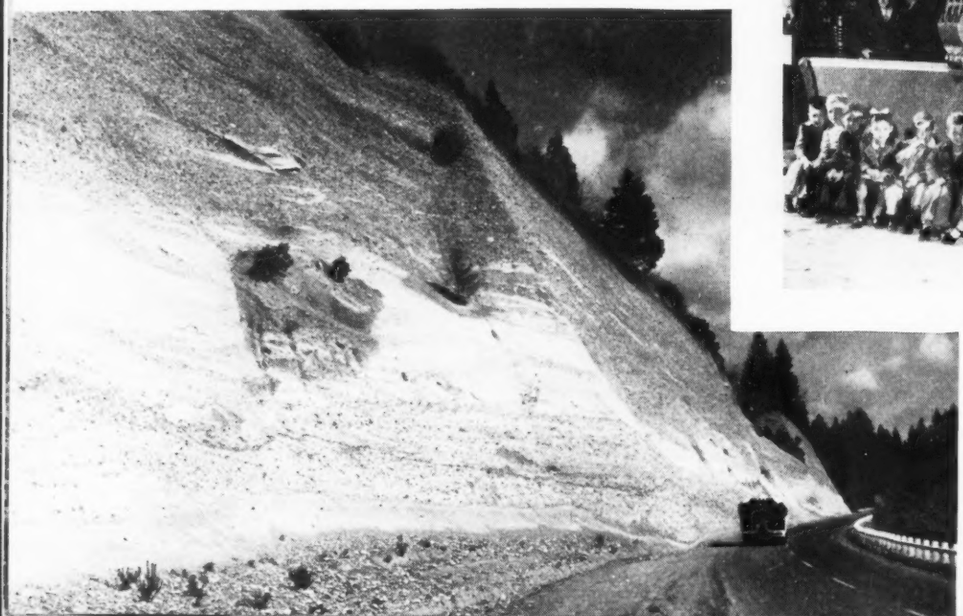
FLYING BLADE on Caterpillar No. 12 motor grader turns near-vertical cut slope on Leonard & Slate, Portland, Ore., job of relocating 3 mi. of corkscrew highway between Skamokawa and Gray's River, Wash.

THATCHERS repair roof of pavilion of Perth, England, Bowling Club. Few of these craftsmen are left, as slates have replaced reeds on most roofs.

British Combine Photo

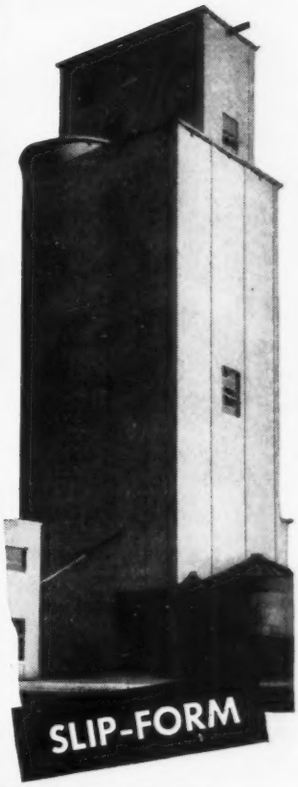
NATURE'S "WEATHER MAP" (below), indicating prehistoric climate conditions in California, is disclosed by cut for new location of U. S. Highway 40 through gravel deposits 30 million years old. Thickness of gravel layers and fineness or coarseness of material deposited, according to the late G. B. Ashcroft, senior structural engineer, California Department of Public Works, furnish evidence by which to estimate amounts of annual rainfall. Deposits uncovered by construction for California's Division of Highways constituted river channel in Tertiary geological period. Preserved in gravel layers there have been found casts of leaves and fragments of trees.

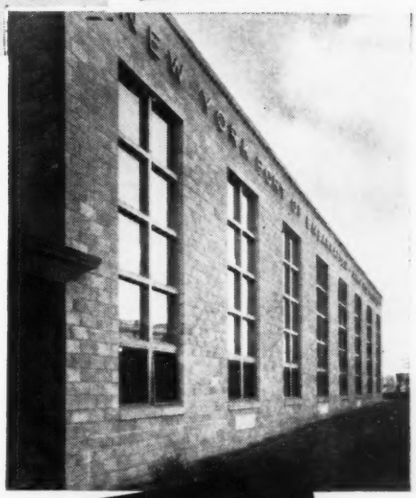




SMALL FRY gang up on big dozer. Seated in dozer blade of International TD-24 diesel crawler tractor are children of International Harvester Co. employes who attended recent "open house" at new Melrose Park Works near Chicago. New plant is former Buick Engine Works built as war project.

ADAPTABILITY TO CONCRETE CONSTRUCTION





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Send for further information. *Write to Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.*

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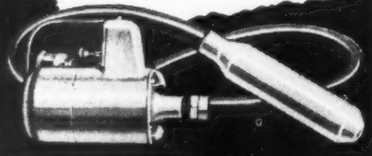

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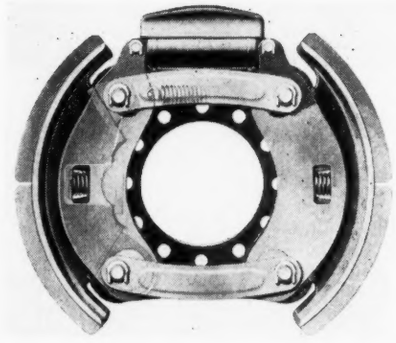
CONSTRUCTION EQUIPMENT NEWS

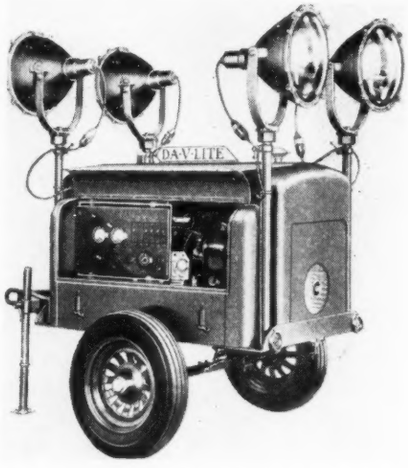
JANUARY 1947 REVIEW of Construction Machinery and Materials

HYDRAULIC BRAKE—"DP" dual primary hydraulic brake is now being manufactured in new heavy duty series to meet needs of operators of big trucks. Operating principle is identically same as medium-duty series. Greater braking ability, equally effective in either forward or reverse, results from "DP" brake being so designed that both shoes act as primaries in either direction. This is only hydraulic brake, it is claimed, that has 3/4-in. tapered liners and is mounted on open-type steel brake spider to provide low-temperature operation. Steel spiders are rugged and rigid, yet light in weight. Removable dust shields are

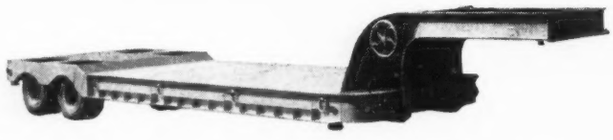


available if required. There is single point adjustment for each shoe adequate to compensate for wear of liners.—**The Timken-Detroit Axle Co., 100-400 Clark Ave., Detroit 32, Mich.**

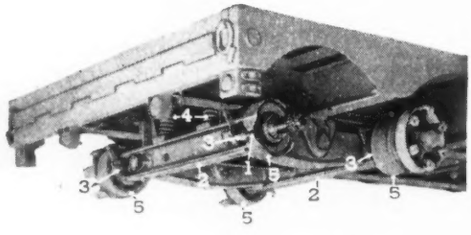
PORTABLE LIGHTING AND POWER UNITS—Each of four new Da-V-Lites is built around 5000-w. Westinghouse self-excited, self-regulated a.c. generator, driven by 15-hp., four-cylinder Wisconsin air-cooled engine, equipped with electric start-



er. Four standard models are floodlight, searchlight, combination and beacon. All are available in skid and two-wheel spring trailer mountings. Trailer machines are 9 ft. long, 7½ ft. high and 5 ft. wide. Weight is approximately 1,750-lb. — **Davey Compressor Co., Kent, Ohio.**



BE *SURE* YOUR NEXT TRAILER HAS ALL THESE FEATURES . . .



Deep, wide flange main beams running the full length of the trailer, I-Beam sections for cross-members and outriggers, improved, fabricated gooseneck, and all electric-welded construction. Look at all the other features found only on Jahn tandem axles: (1) constant lift cam, (2) two full-width axles attached to longitudinal rocker beams, (3) worm gear type slack adjusters at each wheel, (4) heavy coil springs at each axle and (5) positive equalizing braking at each wheel regardless of position of axle.

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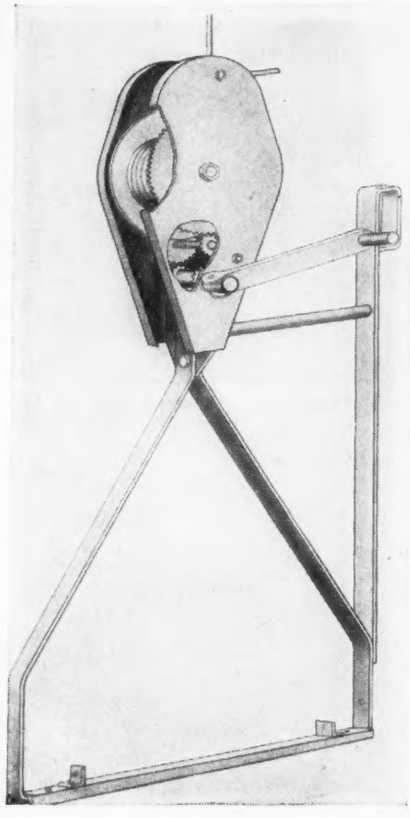


offers great safety, due primarily to its completely new winch design. It is entirely gear operated. Swing consists of two winches, each equipped with 150 ft. of cable. Stirrup which will take platform up to 28 in. in width is bolted to each winch and can be removed for easy storage. Guard rail post is welded to each stirrup. Steel gear housing prevents foreign matter from entering gears and gives added protection to operator.—**Safway Steel Products, Inc., Milwaukee, Wis.**

ENGINE DE-SCALER — Developed to keep radiators and motors of trucks, tractors, and industrial engines permanently free of scale, Butler AT 1 self-energizing electronolytic de-scaler is said to prevent pitting and corrosion. It prevents formation of scale and brings about gradual, efficient cleaning of entire cooling system. This non-chemical device, harmless to rubber and metals, is fully automatic, without wires or switch connections. It is easy to install and designed to operate efficiently for period of one year, or minimum of 25,000 miles.—**Butler Engineering Co., P. O. Box 1699, New Orleans 11, La.**

Equalizing the Elements
IN
CONCRETE
CONSTRUCTION

KAPCO 336
JOINT SEALING COMPOUND

Unaffected by any Change of Weather

From experience and research has come a rubber joint sealing compound that eliminates the hazards of changing weather conditions.

All pavements require watertight, sealed joints. KAPCO 336 Joint Sealing Compound provides and maintains a perfect bond; and seals against weather infiltration and pumping joints.

Even the unusual contraction of sub-zero weather, and the extreme expansion of 100° summer days will not crack or break its bond.

KAPCO 336 is easily heated and poured mechanically or by hand.

Meets Federal Specification SS-F-336, C. A. A. Specification P-605, and all State Highway Depts. using rubber asphalt type of joint seal.

KEYSTONE OFFERS EQUIPMENT LINE . . .
Expansion joint slitting units and concrete curing compound spraying units best suited for Keystone materials are now offered to the trade. Write Keystone today for complete information and prices.

KEYSTONE ASPHALT PRODUCTS COMPANY
A DIVISION OF AMERICAN-MARIETTA COMPANY
GENERAL OFFICES: 43 E. OHIO ST. CHICAGO 11, ILL.
MFG. PLANT: CHICAGO HEIGHTS, ILL.

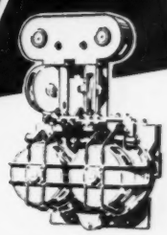
IT'S WHAT'S INSIDE

... that makes the man

Isaacson

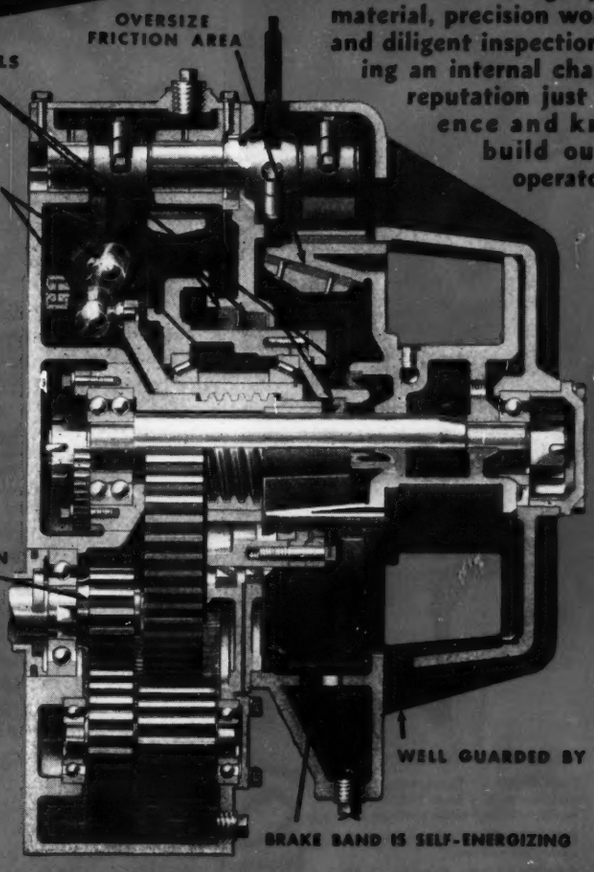
KABLE POWER UNIT

... is like that, too!



Modern basic design, plus tested material, precision workmanship and diligent inspection, is building an internal character and reputation just as experience and knowledge build outstanding operators.

The same internal character is built into either the single or double drum units—both are available for your tractor.


OVERSIZE FRICTION AREA
DOUBLE SEALS ELIMINATE OIL LEAKS
NO SLACK IN CONTROLS
SIMPLE FRICTION ADJUSTMENT
NO BEARING OR GEAR ADJUSTMENTS NECESSARY
ALL GEARS RUN IN OIL
HEAVY-DUTY CONSTRUCTION THROUGHOUT
COMPACT DESIGN... FEW PARTS... SIMPLE OPERATION
WELL GUARDED BY OWN CASE
BRAKE BAND IS SELF-ENERGIZING

Isaacson Kable Power Unit is the secret of profitable, trouble-free cable operation. See your tractor dealer or write for further information.

ISAACSON

Tractor Equipment

A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE

This New Onan FLOODLIGHTER

Solves your lighting problems!

High-speed mobility
•
Quick electric starting
•
Simple operation
•
Dependable large-area lighting

NIGHT OPERATIONS are easier, faster, safer . . . with the mobile Onan Floodlighter. Special dolly mounting permits quick hitching and high-speed towing. On location, the Floodlighter is easily moved, operated and serviced by one man.

Three 1000-watt lamps, enclosed in spun aluminum reflectors, provide brilliant illumination for airport runways, loading ramps, aprons, outdoor depots and construction sites.

Rugged, weatherproof, sheet-steel housing protects the 3000-watt A.C. power plant. The prime mover is an Onan air-cooled gasoline engine direct connected to the generator for maximum compactness and permanent alignment. Quick and sure push-button electric starting.

Motor-driven tools and auxiliary lights plug-in directly at the four outlets mounted on a recessed panel.

Standard Equipment

FLOODLIGHTS: Three; height adjustable to 8½ feet; 360 degree horizontal arc; wide vertical arc.

ENGINE: Onan 2-cylinder, 4-cycle, air-cooled.

GENERATOR: 4-pole, self-excited, inherently regulated.

DOLLY MOUNTING: Two ball-bearing steel-disc wheels; 6 x 15, four-ply pneumatic tires; ball trailer hitch; deadstands.

STARTING: Electric push-button; batteries supplied.

•

ONAN Electric Plants are available in many sizes and models.

ALTERNATING CURRENT: 350 to 35,000 watts in all standard voltages and frequencies.

DIRECT CURRENT: 600 to 10,000 watts, 115 and 230 volts.

BATTERY CHARGERS: 500 to 3,500 watts; 6, 12, 24 and 32 volts.

D. W. ONAN & SONS INC.
4950 Royalston Ave. Minneapolis 5, Minn.

POWER & LIGHT FOR EVERY NEED
Onan
ELECTRIC PLANTS

Write for detailed information

DRAFTING PENCIL—New aluminum drafting pencil, known as Elastichuck pencil, has collet in neck of chuck which grips lead and cushions it against undue pressure, eliminating unnecessary lead-breakage. Rubber collet is only contact between lead and pencil.

Hardened steel chuck cannot be damaged when sharpening leads against file or sandpaper pad and is knurled for those who grip pencil close to its point. Barrel is also knurled and tapered. Roll-stop keeps pencil from rolling off inclined drawing boards. This pencil, available in single or double end, uses all standard drawing leads. Indexed tip identifies lead in pencil.—**Elastichuck Sales Co., Box 220, Inglewood, Calif.**

BUSINESS FORM SAMPLES — To make it possible for firms in construction industry to examine cost-reducing systems used by comparable business organizations for consolidating and simplifying writing operations, new sample portfolios are available. Containing extensive array of business forms utilized throughout this industry, portfolios will suggest innumerable time-reducing and cost-cutting methods of streamlining records and procedures.—**Systems Department, Uarco, Inc., 5000 South California Ave., Chicago 32, Ill.**

RUBBER-FRAMED GOGGLE — New rubber-frame goggle, equipped with large, single-acetate lens and specifically designed to protect workers against chemical and dust hazards, can be worn in combination with R-1000 respirator. This goggle provides wide-angle vision, good ventilation and long wearing comfort and may be worn directly over eyes or over most types of prescription glasses. It is recommended for wear on jobs requiring handling of acids and caustics.—**American Optical Co., Southbridge, Mass.**

REGISTRATIONS *SHOW* IT—OPERATORS *KNOW* IT!

"FORD TRUCKS LAST LONGER!"

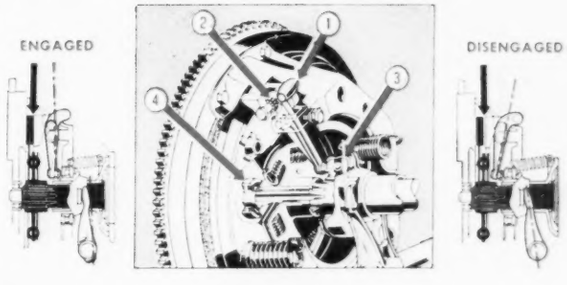
90 6 H.P.
YOUR PICK OF POWER
100 V-8 H.P.

Wherever earth, building materials, coal or similar bulk loads have to be hauled, you'll find Ford Trucks paying off handsomely. This Heavy Duty Ford 2-ton unit has Hoist and Dump body by Marion Metal Products Co., Marion, Ohio.

ONE big reason:

FORD CLUTCHES STAND UP!

Torque-transmitting capacity of Ford clutches increases with engine speed, because centrifugal force is harnessed to add *extra* pressure to that exerted by the clutch springs. Thus, slippage and wear are minimized. Three weighted, cam-action levers (1), due to centrifugal force, act upon the back of the clutch plate, forcing it ever more firmly into contact with the clutch disc. Needle roller bearings (2) on these pivoted levers, and pre-lubricated ball pilot and throwout bearings (3 and 4), reduce wear at these vital points and promote easy pedal action. No internal lubrication is required.



Ford

ONLY IN A FORD TRUCK do you get your choice of two great engines, the 100-H.P. V-8 or the 90-H.P. Six. ONLY FORD brings you all these long-life features: Easy-turning, rolling-contact steering gear, with triple roller bearings—weather-proofed Hi-Volt ignition—positive control of engine temperature for swift warm-up, protecting bearings, cylinders, pistons, rings and valve mechanism—rear axle design which takes all weight-load off the axle shafts (¾-floating in half-ton units, full-floating in all others)—all told, *more than fifty* such endurance-assets!

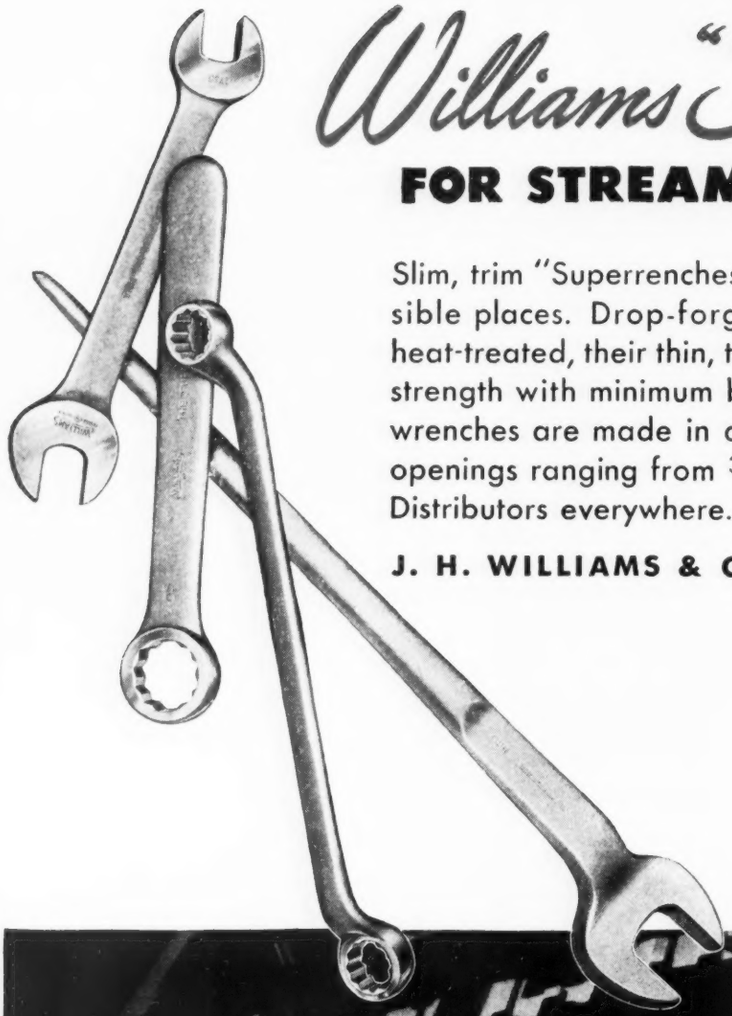
Where can so few truck dollars get you so much *truck value?* Ford endurance-engineering explains why FORD TRUCKS LAST LONGER . . . why the average age of all Ford Trucks in use is nearly 9 years . . . why 7 out of 11 of all Ford Trucks built since 1928 are still in use! Only the costliest makes match this record. No wonder that demand for new Ford Trucks is forcing production schedules higher and higher. See your Ford Dealer now!

FORD TRUCKS

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE

Williams "Superrenches"

FOR STREAMLINED STRENGTH



Slim, trim "Superrenches" deliver agile power to inaccessible places. Drop-forged from selected alloy steel and heat-treated, their thin, tapered jaws combine unbelievable strength with minimum bulk and weight. These versatile wrenches are made in a variety of popular patterns, with openings ranging from $3/16$" to $3\text{-}1/8$". Sold by Industrial Distributors everywhere.

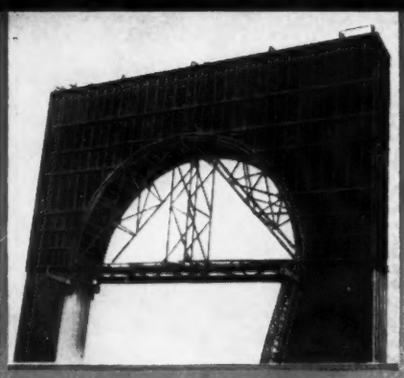
J. H. WILLIAMS & CO., BUFFALO 7, NEW YORK

WILLIAMS

DROP-FORGINGS AND DROP-FORGED TOOLS

Atlas
Labor-Saving Concrete Forms

Tunnel Forms



Bridge Pier

ATLAS STEEL FORMS are cutting labor costs on concrete construction 25 to 50% and more for contractors and engineers all over the country. New design in steel forms, standardization of units which are good for indefinite use without repair, advantageous use of conditions at site and other Atlas methods and processes make tremendous savings in labor and time in erection, moving and stripping of form work.

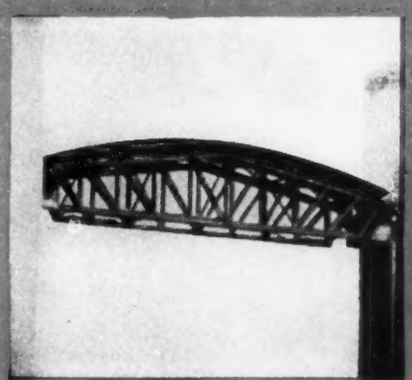
Call on us for facts and figures—layouts, labor costs, and any other data needed in connection with form work. Let us show you what Atlas Steel Forms can do for you, too.

ATLAS STEEL CONSTRUCTION COMPANY

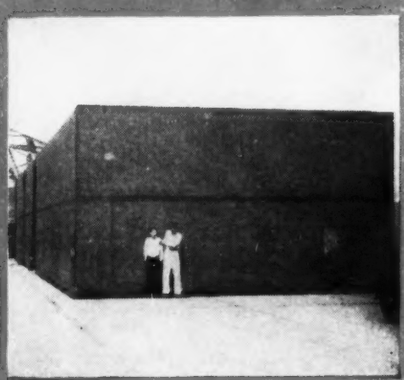
742 Late Street

Irvington, New York

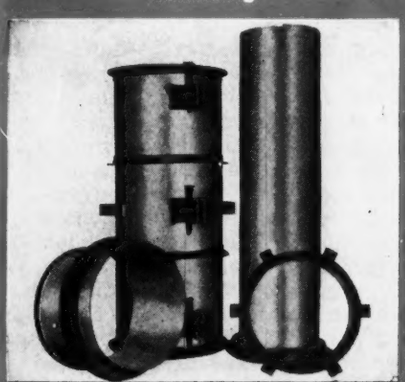
Patented and Patents Pending



Centering



Box Caisson

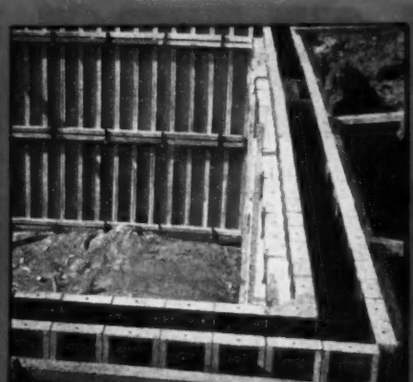


Concrete Pipe

Column Forms

Sewer Forms

Flat Slab Forms



Foundation Wall

Bins and Caissons

Call Us In And Find Out What Atlas Can Do For You

Bertha didn't understand parade work . . .
so they fixed her with Crosby Clips!

703

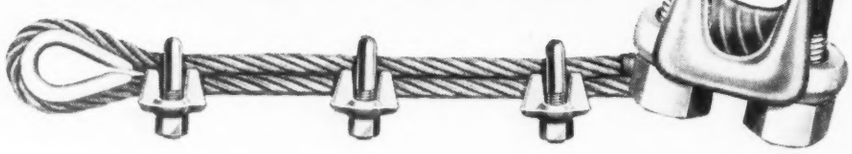
For the long pull, for the heavy drag, for stubborn and hard-to-handle wire rope jobs, there's only one best fastener, of course . . . dependable CROSBY CLIPS. From the little ⅛-inchers on up to the "jumbo" sizes, made for 3 and 4 inch wire rope (so big you can hardly lift a pair), the CROSBY CLIP line is perfectly complete. They're *drop-forged*, not cast. Hot dip galvanized. Safe, simple, sturdy. Available through distributors everywhere; made exclusively by American Hoist and Derrick Co., St. Paul 1, Minnesota.

Industry buys more

CROSBY CLIPS

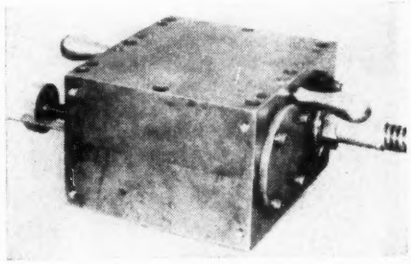
than all other

drop-forged fasteners



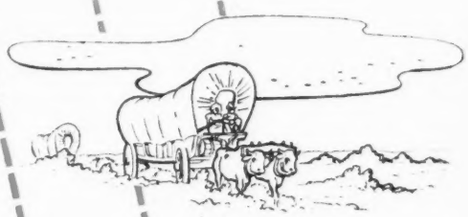
EXPANSION JOINT SLITTER—New automatic unit for slitting all types of expansion joints, driven by 1-hp. electric motor, or gasoline motor, cuts all joint materials up to 1½ in. in thickness at rate of 60 ft. per min. Keystone expansion joint slitter, modern and streamlined in every way, can be plugged in and operated by one man. Forward and reverse operation permits cutting in either direction.—**Keystone Asphalt Products Co., 43 E. Ohio St., Chicago 11, Ill.**

MECHANICAL OSCILLATOR—Sonntag LA-1 oscillator, compact, portable machine for inducing vibrations in structures and assemblies, weighs only 61 lb. and is attached to structure or machine. Centrifugal force produced by eccentrically supported weights, rotated so that all forces add in one direction and cancel each other in all other directions, provides vibration for test. Force is steplessly adjustable



either while running or stationary by turning micrometer type knob. Maximum allowable force of machine itself is 1,600 lb., but this is multiplied in resonance with structure under test. Multiplication factor is determined by damping of structure. Factors as high as 200 have been encountered, making machine capable of producing loads of 1,600x200, or 320,000 lb. Oscillator has two types of drive, flexible shaft that will permit motor to be mounted away from oscillator or V-belt drive for direct mounting. Standard accessory is control cabinet and desk, mounted on casters, that provides space for reading instruments and controls as well as storage.—**Baldwin Locomotive Works, Philadelphia 42, Pa.**

CONCRETE FLOOR PAINT—Rubbermastic concrete floor paint, made from 100-percent gilsonite, dries tack free in four hours to enamel-like finish. This product will eliminate necessity of etching or priming and do away with soponification troubles, it is claimed, and also is 100-percent waterproof. Flushing floor with water after paint is dry causes flint-like hardness and will resist any acid, alkali, heat, electrolysis, rain, sun, snow, ice and abrasive effects of dirt and sand.—**Tiz-Nu Corporation, 673 Coronade St., Los Angeles, Calif.**



PIONEER AND PACEMAKER

. . . in building high-speed diesels

. . . in placing value before volume

. . . in developing a complete parts-service network

CUMMINS Dependable DIESELS

SINCE 1918 PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA

5 YEARS DEVELOPMENT

ON FIELD TESTS IN EVERY TYPE OF PROSPECTING AND STRIPPING THROUGHOUT THE WORLD.

The Parmanco Single Speed Transmission Drill is designed to meet the requirements of the general prospecting field where it is not necessary to drill in solid limestone. Special sliding frame permits drilling and pulling of augers without moving drill. New design of chuck eliminates all hand operation in raising power plant. Recommended for 50 to 60 feet with four and one-half inch equipment. Under favorable conditions it is being used to greater depths.

PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS

WATER CLARIFIER — Liquon sludge contact reactor has been developed to combine efficiently operations of mixing raw water with coagulating chemicals, properly agitating mixture, maintaining suspended deep sludge bed or blanket of previously accumulated precipitates, completely separating clarified water from sludge, and concentrating impurity-saturated sludge for minimum volume of blow off. Reactor is equally well adapted for coagulation of turbid, colored waters, for softening hard well waters by lime-soda, for simultaneously softening and clarifying hard river waters, and for removal of iron, manganese, silica or fluorides from water.—**Liquid Conditioning Corp., 423 West 128th St., New York 27, N. Y.**

SPLIT STUD—New split stud for securing insulation and similar materials to metal supports or surfaces resembles cotter pin in appearance. It is designed for automatic welding in Nelson stud welders. Solid or closed end is welded to support or surface, leaving split end projecting. Welding is accomplished at rate of 100 to 200 studs per hour. Weld cycle is entirely automatic. Studs are available in diameters from 1/8 to ¼-in. and in lengths up to 3 in.—**Nelson Sales Corp., Lorain, Ohio.**

. . Meet the
UNSEEN GUARDIAN
SYMBOL OF
SISALKRAFT
PRODUCTS

✓ **SISALKRAFT**
. . . waterproof reenforced building paper

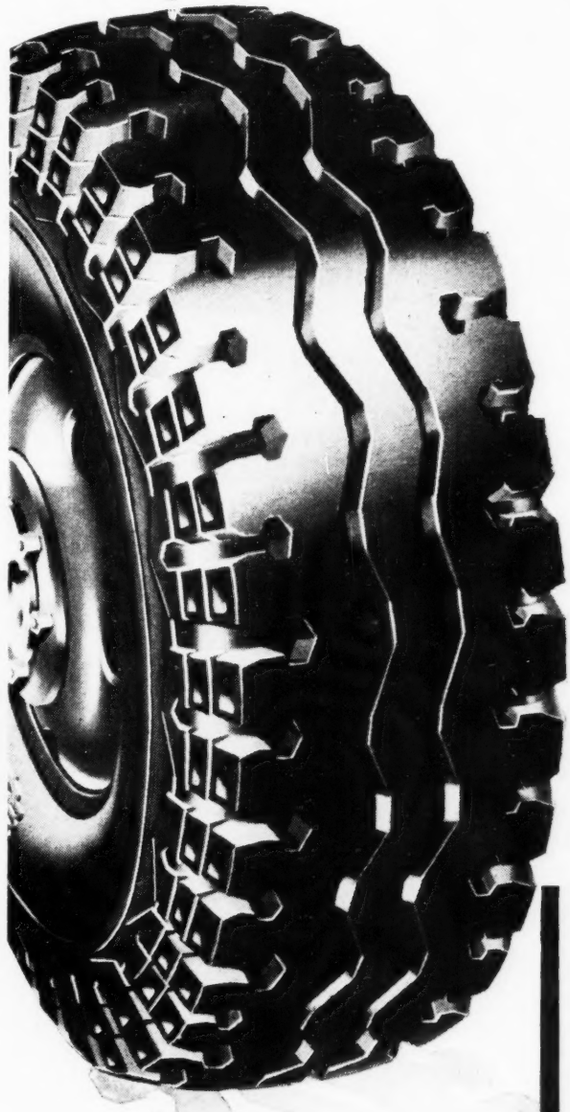
✓ **SISALATION**
. . . reflective insulation and moisture-vapor barrier

✓ **COPPER ARMORED SISALKRAFT**
. . . Sisalkraft plus pure electro deposit copper

THE SISALKRAFT CO.
CHICAGO, ILLINOIS

NEW *Rhino-Flex* CARCASS

with Rayon Cord Gives Armstrong Truck Tires More Mileage, Greater Safety



ROLL your trucks on Armstrong's amazing new "Rhino-Flex" Tires and we know you'll be convinced they're the safest, toughest, coolest running truck tires ever made.

What makes the new Armstrong "Rhino-Flex" Truck Tire take the beating it does mile after mile and still come back strong? It's the carcass—the most important single factor in a tire.

Armstrong worked overtime during the war to develop the toughest tire carcass possible for combat vehicles. "Rhino-Flex" carcass was Armstrong's answer. And according to combat reports, it produced the toughest Armstrong Tire ever built.

Now you can get this great new super truck tire with tighter twisted *rayon cord*, that assures you greater strength, more flexibility, cooler running. Armstrong "Rhino-Flex" Truck Tires are available coast to coast. See them! Compare them with any other truck tire ever made at any price. You'll choose Armstrong every time!

Plus 3 Great Tire Developments:

1. NEW TOUGHER CARCASS...
Armstrong's amazing new "Rhino-Flex" carcass wears longer, resists more shocks and bumps; lasts and lasts.

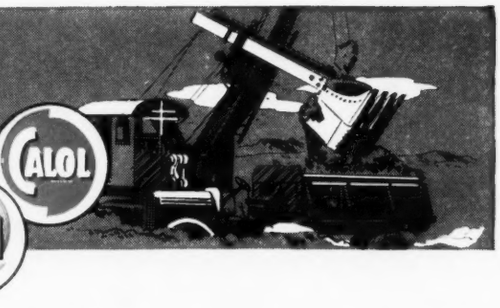
2. NEW FLEXING FABRIC...
Tougher, tighter twisted rayon cords help fabric "give" with impact; snap back smoothly; assure cooler running.

3. NEW FLATTER TREAD...
More rubber on the road gives you safer, surer stops, quicker starts, and you get better cushioned rides.

ARMSTRONG *Rhino-Flex* TIRES

Manufacturers of Quality Tires and Tubes since 1912 · General Offices and Plant—460 Elm Street, West Haven 16, Conn.

STANDARD ENGINEERS NOTEBOOK



Heat-resistant grease stays in wheel bearings

RPM Wheel Bearing Grease is specially made for all types of wheel bearings. Because it withstands extreme heat, it won't melt and throw out even in hard service. This prevents lubricant from working onto brake shoes and keeps bearings from becoming dry. Where necessary, extra grease can be packed in hubs, thus assuring adequate lubrication at all times.

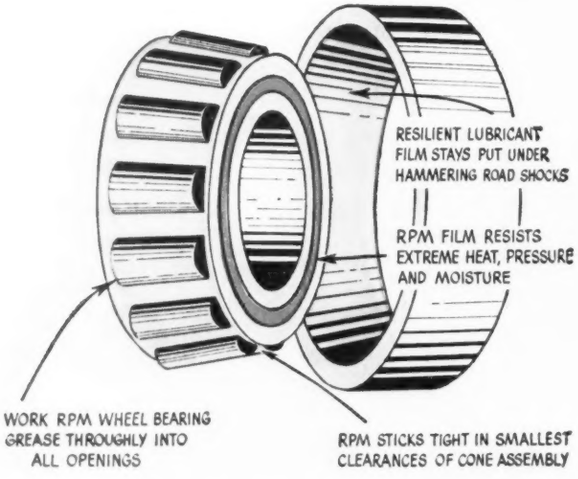
The tough, resilient film which RPM Wheel Bearing Grease spreads over bearings, won't break down under extreme pressure or jolts and shocks. It resists water and seals out dust and dirt.

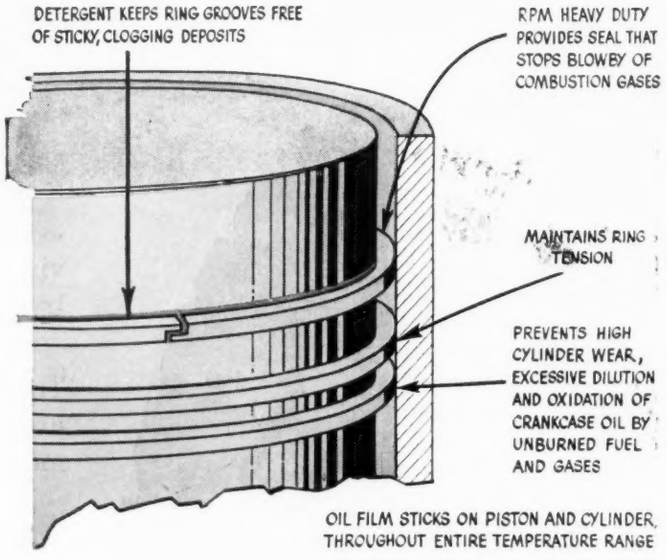
Truck and bus manufacturers recommend using extra care in lubricating, cleaning, and adjusting wheel bearings.

Handy guides that assure this are the free Standard booklets, "How to Service Wheel Bearings." There's one for light equipment and one for heavy equipment. Send for your copies.

CLEAN WHEEL BEARINGS CAREFULLY BEFORE LUBRICATING

IF PART IS DAMAGED REPLACE ENTIRE BEARING ASSEMBLY


RESILIENT LUBRICANT FILM STAYS PUT UNDER HAMMERING ROAD SHOCKS
RPM FILM RESISTS EXTREME HEAT, PRESSURE AND MOISTURE
WORK RPM WHEEL BEARING GREASE THROUGHLY INTO ALL OPENINGS
RPM STICKS TIGHT IN SMALLEST CLEARANCES OF CONE ASSEMBLY


DETERGENT KEEPS RING GROOVES FREE OF STICKY, CLOGGING DEPOSITS
RPM HEAVY DUTY PROVIDES SEAL THAT STOPS BLOWBY OF COMBUSTION GASES
MAINTAINS RING TENSION
PREVENTS HIGH CYLINDER WEAR, EXCESSIVE DILUTION AND OXIDATION OF CRANKCASE OIL BY UNBURNED FUEL AND GASES
OIL FILM STICKS ON PISTON AND CYLINDER, THROUGHOUT ENTIRE TEMPERATURE RANGE

Heavy-duty motor oil reduces cylinder wear

Many fleet operators have eliminated stuck rings, blow-by and excessive cylinder wear by using RPM Heavy Duty Motor Oil.

This special heavy duty oil contains patented additives which remove sticky gum, carbon and lacquer from rings and ring grooves, keeping rings free so they can expand fully. With rings expanded, the tough lubricant film of RPM Heavy Duty Motor Oil forms a seal between rings and cylinder which prevents the force of combustion from driving gases and fuels down the walls.

RPM Heavy Duty Motor Oil sticks to metal at all operating temperatures. This assures unsurpassed lubrication at all times on surfaces of cylinders, pistons and rings, reducing wear to a minimum.

RPM Heavy Duty Motor Oil will resist sludge formation even in coldest operations, will not foam or corrode bearing metals.

For additional information and the name of your nearest Distributor, write Standard of California, 225 Bush Street, San Francisco 20, Calif.; The California Oil Company, 30 Rockefeller Plaza, New York 20, N. Y.; The California Company, 17th and Stout Streets, Denver 1, Col.; Standard Oil Company of Texas, El Paso, Texas.

FOR EVERY NEED A STANDARD OF CALIFORNIA JOB-PROVED PRODUCT

PMCO

America's Most Complete Line of Material Handling Buckets

All purpose

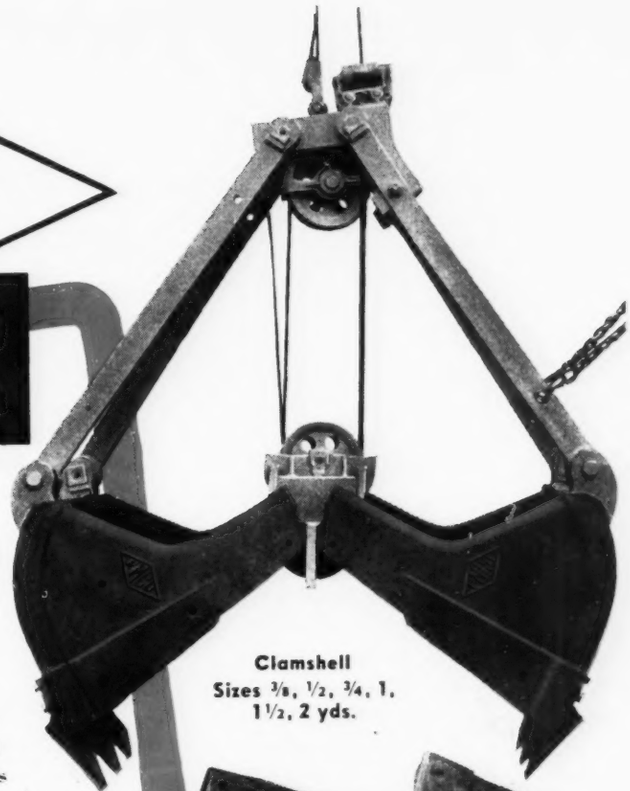
- SHOVEL
- PULLSHOVEL
- DRAGLINE
- CLAMSHELL

• FRONTS, BOTTOMS, SCOOPS AND TEETH shown in red on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.

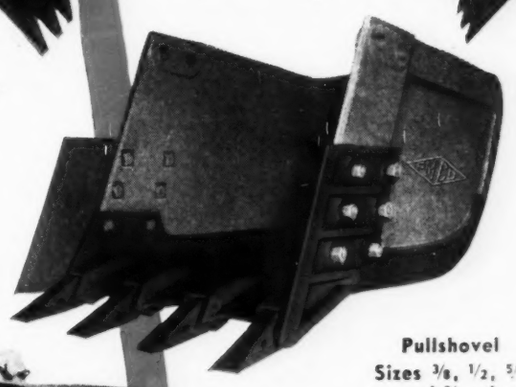
On the 1/2 yd. and 3/4 yd. Shovel and Pullshovel Buckets, all teeth are interchangeable — a great advantage to operators.

Experience Counts

See your shovel man or equipment dealer about PMCO Buckets and Dippers.



Clamshell
Sizes 3/8, 1/2, 3/4, 1, 1 1/2, 2 yds.



Pullshovel
Sizes 3/8, 1/2, 5/8 and 3/4 yd.

Dragline
All Purpose Sizes 3/8 to 2 yds.
Stripping sizes 2 to 9 yds.

Shovel
Sizes 3/8 to 18 yds.

"Quality Since 1880"

PETTIBONE MULLIKEN CORP. CHICAGO 51, U. S. A.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES.

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IS THE
WORD FOR
PERFECTION
BODY and HOIST
DESIGN

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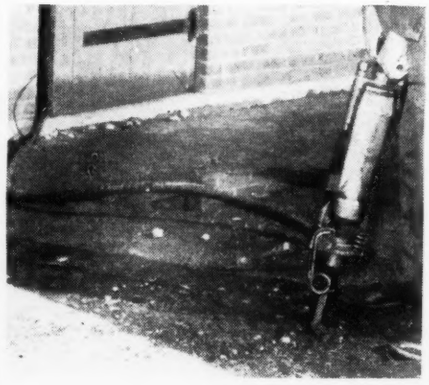
THE PERFECTION STEEL BODY COMPANY
GALION, OHIO

PERFECTION
STAKE and DUMP BODIES
HYDRAULIC HOISTS

FOR ANY TRUCK
STANDARD or SPECIAL UNITS
IN ALL SIZES · FOR ANY USE

SAFETY HOSE—Developed by Darin & Armstrong, Detroit contractors, new safety air hose bypasses current around operator of drill or pneumatic concrete buster to prevent serious accidents caused by drilling into underground high-tension lines. Based on theory that electric current takes path of least resistance, hose consists of spiral of 832 braided strands of No. 30 bare copper



wire embedded in Neoprene synthetic rubber. When properly grounded, hose has resistance of less than 0.06 Ohms, as compared with 200 to 1,000 Ohms for human body. When drill point strikes high-tension wire, current shorts through hose, even if operator is standing on damp ground. When used with plant air supply lines, grounding is automatic; if used with portable compressors, adequate ground must be provided. Under license with contractors, who have applied for patent, hose is being manufactured by **Mercer Rubber Co., Hamilton Square, N. J.**

NYLON RODS which can be machined accurately, made of DuPont's FM-1 nylon molding powder, result from new technique to extrude plastic. Rods range from ⅛ to 2 in. in dia., and from 2 to 4 ft. in length, and can be used in making valve seats, gaskets, etc.—**The Polymer Corp., Reading, Pa.**

CENTRIFUGAL PUMPS—New line of "Pedrifugal" pumps is said to meet needs of unusually wide range of users who require sturdy, reliable pump of moderate capacity. This line of cast-iron bronze-fitted, pedestal-type centrifugal pumps comes in three principal sizes—1x1 in., 2x2 in. and 3x3 in. Capacities are from 10 to 500 gpm. at heads from 10 to 100 ft., with power requirements from ¼ to 15 hp. Units are splatter-finished with gray enamel. Pumps are designed for use with Texrope V-belt drives, all are fitted with impellers of maximum diameter, and variations in capacity are provided by changes in speed through sheaves of larger or smaller diameter.—**Allis-Chalmers Mfg. Co., Milwaukee, Wis.**

30 SECONDS the BLACKHAWK Way VS. 4 Minutes the Old Way!

210 Seconds Slashed on This Assembly Job!
The right Blackhawk Socket Wrench Combination (a brace and socket) runs down this nut in 30 seconds. Formerly, a rigid wrench took 4 minutes for the same operation.

Combinations From Blackhawk's Array of Standard Handles and Attachments Create Extra Speed . . .

WHEREVER a nut is turned on a bolt there's a Blackhawk Socket Wrench for the job. No need for special wrenches when you use Blackhawks. Choose the handle with the right leverage, add whatever attachments are necessary and you're ready to go to work. Blackhawk's patented "Lock-on" makes Blackhawk Wrenches superior for this purpose because the combination locks together into a solid tool that cannot be accidentally disengaged. And Blackhawk has a complete range of socket sizes that assure you of the right wrench for every job. See your Blackhawk Industrial Supply Distributor or write Blackhawk for catalogs.

A product of **BLACKHAWK MFG. CO., Dept. W 2317, Milwaukee 1, Wisconsin**

ANOTHER BLACKHAWK COST-CUTTER

"TORKFLASH"

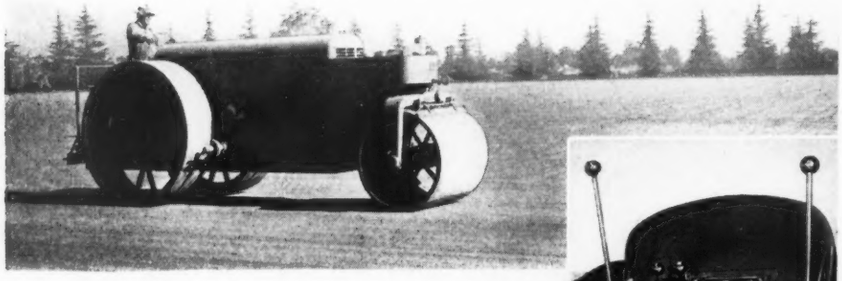
Prevent breakage of nut and bolt assemblies and stripping of threads. Have the workman measure his pulls with the Blackhawk "Torkflash" Tension Wrench. Exclusive—a flash of light tells when to stop pulling!

Always Specify

BLACKHAWK SOCKET WRENCHES

you can tell . . .

IT'S A BUFFALO-SPRINGFIELD!



You can tell a lot by the "looks" of a piece of equipment. The smooth compact appearance of a Buffalo-Springfield Roller is the outward evidence of leadership in design. Look at the control panel at the right. Just one of the "fine points" on a machine where no part is considered too small to get painstaking engineering attention.

Ask your distributor for literature.

3-wheel rollers 6-12 tons; 3-axle tandem rollers 9-17 tons; tandem rollers 3-14 tons; trench rollers.

THE STANDARD OF COMPARISON

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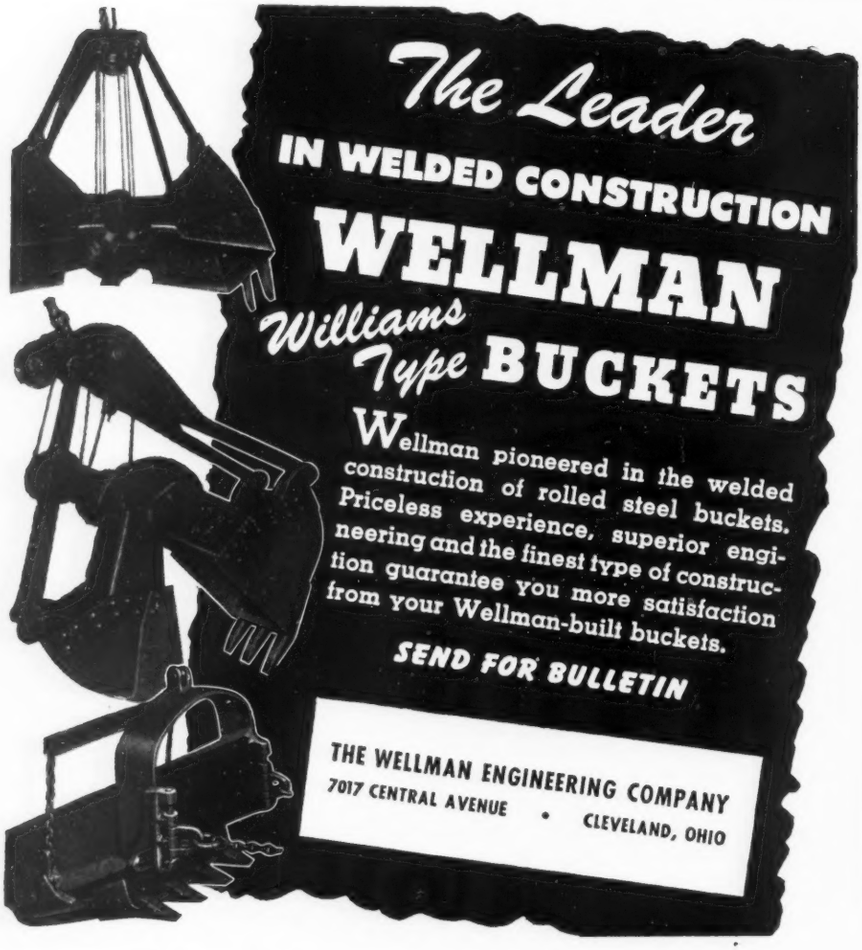
SPRINGFIELD, OHIO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IN WELDED CONSTRUCTION
WELLMAN
Williams Type BUCKETS
Wellman pioneered in the welded construction of rolled steel buckets. Priceless experience, superior engineering and the finest type of construction guarantee you more satisfaction from your Wellman-built buckets.
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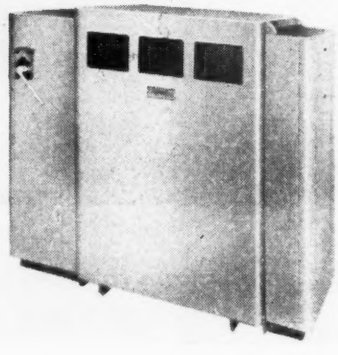
THE WELLMAN ENGINEERING COMPANY
7017 CENTRAL AVENUE • CLEVELAND, OHIO

PORTABLE CRUSHING AND SCREENING PLANT — New, small, portable crushing and screening plant, Pitmaster Straightline has primary crusher with 10x16 in. roller bearing jaw; secondary is 16x16 in. roller bearing roll crusher. Double-deck horizontal vibrating screen 30 in. x 9 ft. 5 in. gives plant exceptionally low traveling height. Plant is offered with choice of reciprocating feeder or swivel feed attachment to fit different feeding conditions. Other optional equipment includes chip attachment and bins with delivery conveyor extensions. Total weight of Pitmaster is 31,000 lb. without power unit; transport length with feeder attached is 33 ft. and traveling height 11 ft. Plant is operated by 50-60-hp. gasoline or diesel engine. It is complete gravel plant and can be quickly converted into modern quarry plant by putting 15x36 in. or 15x24 in. portable primary ahead of it.—**Iowa Manufacturing Co., Cedar Rapids, Iowa.**

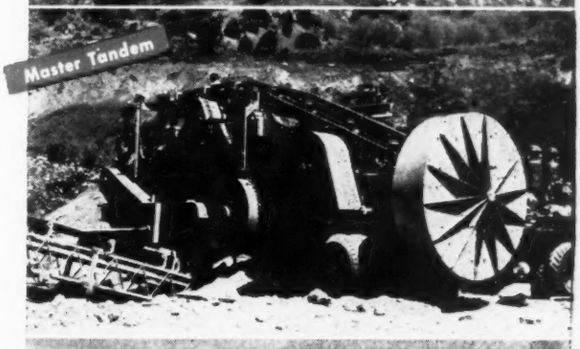
COMPACT UNIT SUBSTATION—High voltage incoming line, transformer, and low voltage feeder sections are combined in one compact assembly in new all-in-one unit substation. Installation is simplified, as units are delivered

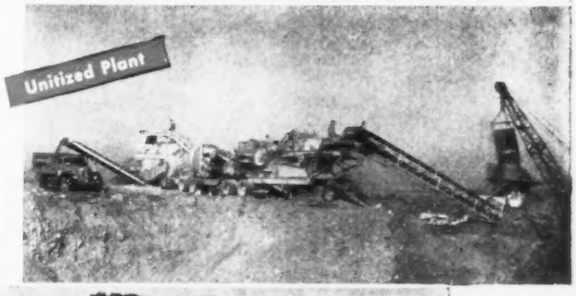


ready to connect. This substation has ratings of 100, 150, 200, and 300 kva., 3 phase, 60 cycles. Choice of combinations of different types of transformers and high and low voltage equipment make it suitable for wide range of applications. — **Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14, Mo.**

HYDRAULIC UTILITY TABLE—New hydraulic utility table raises its load by foot pedal to exact height required. Operator's hands are free during lifting operation. Table rated at 2,000 lb. capacity is mounted on heavy-duty roller-bearing casters of 6-in. dia. with swivel arrangement permitting easy maneuvering when carrying capacity load. Heavy-duty foot-operated floor lock anchors table to job.—**Rack Engineering Co., Dept. K, Butler St., Pittsburgh 1, Pa.**

make 1947 more profitable with Cedarapids PORTABLE CRUSHING and SCREENING PLANTS





$7½ billions of heavy construction in 1947! Millions and millions of tons of aggregate will be needed.

Here's the line of modern, portable crushing and screening plants that will help you make more money for producing that aggregate. Every unit is made of the finest possible material and skillfully engineered to assure long, trouble-free operation, low-cost production and flexibility to meet every operating condition.

- 100 to 150 tons per hour of 1" material are easy for the big Cedarapids Master Tandem.
- The Cedarapids Junior Tandem is similar to the Master but smaller in size.
- The Cedarapids Pitmaster is our smallest portable straightline crushing plant but owners say there's nothing small about its production.
- The Cedarapids Unitized Plant is the most versatile, portable crushing, screening and washing plant ever offered. Will handle rock or gravel, dry or washed—with almost any desired capacity.
- The Cedarapids Portable Hammermill plant is the ideal unit for large production of agstone and road stone.

See your nearest Cedarapids dealer for details. When you buy a crushing plant — buy the best — buy Cedarapids.

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ROCK AND GRAVEL CRUSHERS
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WASHING PLANTS
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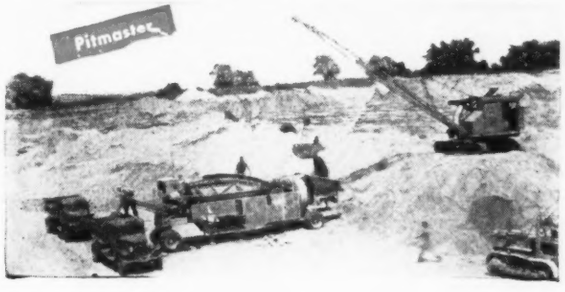
HAMMERMILLS



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Cedarapids
Built by IOWA

New uses for Sonotube

PIER WORK
Sonotubes have been successfully used for forming concrete piles in building salt water docks.

PLATFORM CONSTRUCTION
Sonotubes save time, labor and money in forming piers for all manner of loading docks and heavy platform work.

SUPPORTING COLUMNS
Sonotubes have been used in forming supporting columns up to 14' high in building construction.

WEEP HOLES
Sonotubes are the cheapest answer to forming weep holes in bridge abutments.

OUTFALL STORM SEWERS
Sonotubes can be quickly placed and connected for forming outfall storm sewers.

SMALL CULVERTS
Simply dig required ditch—pour 3" base—place Sonotubes in position and fill with concrete.

LAMINATED FIBRE TUBING
to be cut to lengths on the job—shipped in lengths up to 24' long.

INSIDE DIAMETER					
8"	9"	10"	11¼"	12"	13½"
SQUARE INCHES					
50.26	64	78.54	100	113.1	144

Smaller Sizes Available

IMMEDIATE DELIVERY

Write for Delivered Prices

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HARTSVILLE, S. C. MYSTIC, CONN.
ROCKINGHAM, N. C. GARWOOD, N. J. LOWELL, MASS

ARC WELDING WIRES AND TAPES—Group of automatic arc welding wires and tapes has been introduced, embracing five knurled type wires and five tapes all for flat position operation and all highly recommended for low-cost, uniform, automatic welding. Their applications on production line are many, ranging from thin-gage sheet metal forms to boilers, axle housings, and torque tubes. All Airco wires and tapes have had extensive laboratory tests and practical on-the-job examinations. They are manufactured in several diameters. Wires may be used separately or in conjunction with tapes. **—Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.**

SCAFFOLD UNIT—New quick-action scaffold unit consists of only five lightweight, compact, easy-to-handle parts. Its welded, tubular-metal construction offers greater scaffold strength, rigidity, and safety, and streamlined design provides light weight and broad range of application possibilities not common with use of ordinary trestle equipment. Four hand-set screws make possible any vertical or horizontal adjustment. Accessory pedestals in two heights permit flexibility in height.**—Bil-Jax Manufacturing Co., Swanton, Ohio.**

RAPID!

Junior Model with Horizontal Frame Attachment.

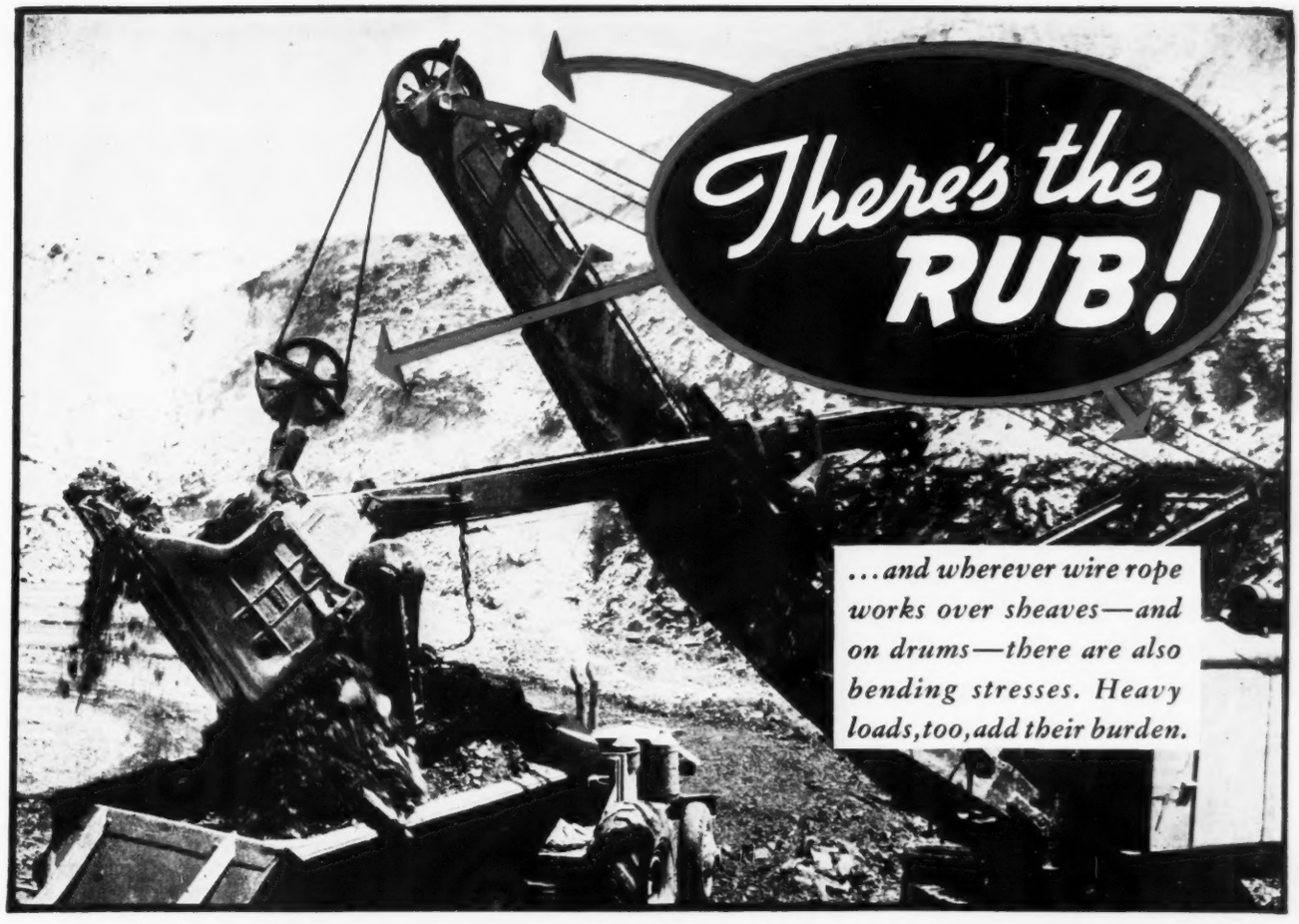
Will break 15 inch reinforced concrete walls up to 10 feet high. Frame attachment can be removed and boom tipped up to vertical position for breaking all types of pavement.

Ask about our

HEAVY-DUTY TYPE

R. P. B. CORP. MFR'S. of RAPID PAVEMENT BREAKER MACHINES

1517 Santa Fe Ave. Los Angeles 21, Calif.


There's the RUB!
...and wherever wire rope works over sheaves—and on drums—there are also bending stresses. Heavy loads, too, add their burden.

You can depend on "Hercules" (Red-Strand) Wire Rope to meet all conditions, because it is the right combination and balance of strength, toughness and durability. As it is made in Round Strand and Flattened Strand constructions—both Preformed and Non-Preformed—there is a correct type for every heavy duty purpose.

Let the Red-Strand be your wire rope guide to faster and more economical production. We invite your inquiries.

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WIRE ROPE

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HERE'S ONE

NEW POST-WAR PUMP

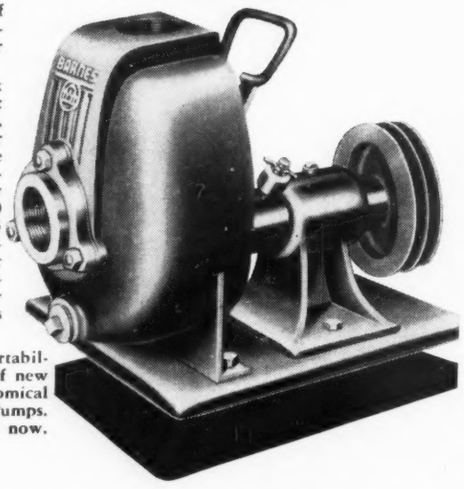
THAT'S READY FOR DELIVERY

Now!

Barnes' NEW UNIVERSAL DRIVE 1½-inch Automatic Centrifugal Pump

TIRED of waiting for "post-war marvels"? There's no need now to wait longer if the marvel you want is an economical, dependable pump adaptable to any power source.

The brand-new Barnes 3MU Pump is slick as a whistle and is as handy as the pocket in a shirt for contractors, industrial plants, municipalities, farmers and gardeners or wherever the operator's own power source is available. It will deliver top performance when belt driven or operated directly from shaft coupling. It delivers up to 5700 gallons an hour with pressures up to 35 pounds per square inch. This new Centrifugal Pump has the same Automatic Prime, Barnes Super-seal, Direct Flow Suction, Non-Clogging Impeller and all other fine features found in Barnes' famous "33,000 for 1" Pumps.



These advantages plus easy portability (35 lbs.) open hundreds of new uses for these rugged, economical and dependable Centrifugal Pumps. They are ready for delivery now. Order one or 100 today!

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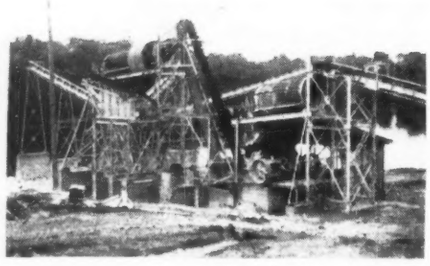
Quality Pump Manufacturers for 50 Years MANSFIELD, OHIO

Crush Your Own Rock

Reliance EQUIPS *your* JOBS



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Rock Crushers, Bucket Elevators, Revolving Screens, Storage Bins, Pulverizers, Chip Spreaders, Heating Kettles, Bin Gates, Feeders, Belt Conveyors, Grizzlies, Air Separators, Sand & Gravel Spreaders, Wash Boxes.

Rather than face the delay and expense of rail or highway shipments of crushed stone, gravel and sand, *install your own plant* and save both time and money.

We'll gladly refer you to contractors who are making money and rushing their work with RELIANCE Equipment.

Write for the latest RELIANCE Bulletins.

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Kingston, N. Y., U. S. A.
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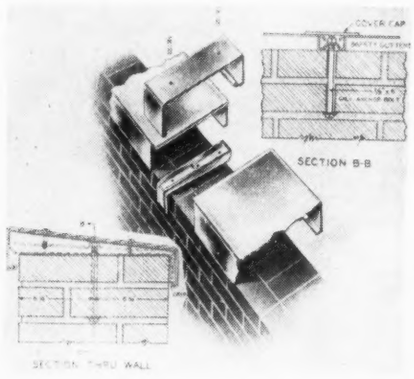
METAL COPING—Simple in construction and easy to handle, Goodwin lifetime metal prefabricated coping, formed of four metal parts, can be quickly assembled and installed, is light in weight, needs no caulking or re-sealing and requires no special tools for erection. Production is being concentrated on 12½- and 8½-in. widths for standard walls in aluminum, copper, Monel, stainless steel, etc. Installation begins with anchor bolts set in mortar when two top rows of bricks are laid in new wall. Hole may be drilled and anchor bolt set in existing walls. Formed metal channel fastens to this anchor bolt and longitudinal sheets with crimped edges hook over gutter bar, forming tight joint, over which slides safety cover. There is ample room for expansion and contraction. Should water creep beneath seam, extruded metal gutter bar easily disposes of it.—**Overly Manufacturing Co., Greensburg, Pa.**



DUAL ELECTRICAL BRAKING—Dual electrical braking system developed for heavy-duty vehicle uses two independent braking systems. One of these, electric retarder mounted on drive shaft of tractor and on live axle of trailer, employs principle of Eddy current brake. Separate system of conventional shoe brakes on all wheels is controlled by electro-magnetic circuit operated by ordinary brake pedal. For emergency stops, micro-switch on brake pedal activates retarder to full capacity at instant pedal is touched, regardless of speed rheostat setting. **—Warner Electric Brake Co., Beloit, Wis.**

HEAVY-DUTY VISE — Quick-action heavy-duty vise, known as Vise Master, incorporates many outstanding advantages. It closes instantly with push on free jaw and opens automatically by trigger release on its spring action. Vise is equipped with "Double Bite" steel pipe jaws integral with body and it completely revolves full 360 deg. on base with double swivel friction type lock-up.—**Grand Specialties Co., Grand Ave. at Gray St., Chicago 22, Ill.**

"PLUG-WELDING" MAKES THIS A BETTER DIPPER

- Plug Welded—improved design
- All Manganese Steel Construction—long service life
- Streamlined—easier penetration, loading, dumping
- Lighter Weight—heavier payloads

¾ TO 2 YARD CAPACITY

OVER 2 YARD CAPACITY

AMSCO DIPPER DESIGN PERMITS STRONGER CONSTRUCTION

Patented inter-locking design of Amsco Plug-Welded, All-Manganese Steel Dippers provides for stress-resistant welds . . . eliminates jutting shoulders that offer resistance to penetration, loading, and dumping.

Plugs in one casting fit into sockets in overlapping casting—see Figure 1. Overlapping portions are rabbetted for interengagement—see Figure 2. In both cases groove is formed for receiving weld deposit.

Additional features of Amsco Plug-Welded Dippers include: clean cutting teeth—rigidly locked in place, easily replaced; correctly contoured lip—shaped for easy penetration, full loading; flared body—tapers out slightly to door for positive, complete discharge of material.

MADE OF "THE TOUGHEST STEEL KNOWN"

The use of manganese steel throughout, plus this new all-welded design, assures the maximum in durability for a light-weight dipper.

Impact that fractures other metals work-hardens the surface of manganese steel without affecting toughness of the body metal. The surface of "the toughest steel known" takes on a "plow-share" polish that resists abrasion and assures smoother penetration and clean dumping.

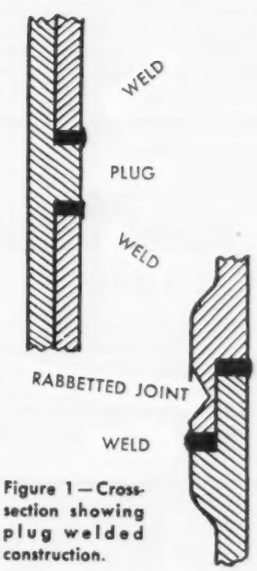


Figure 1—Cross-section showing plug welded construction.

Figure 2—Cross-section showing rabbetted overlap.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.

You should have these

DUFF-NORTON JACKS

to Speed Construction Work

AUTOMATIC LOWERING JACKS

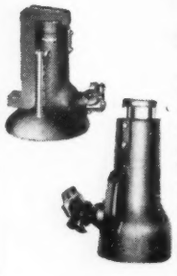
Unexcelled in safety, low maintenance and easy operation, these jacks are available in 5, 10, 15, 20 and 25 ton capacities, for a wide variety of uses in construction jobs. Heights from 14" to 27¾."

HEAVY DUTY SCREW JACKS

For bridge and wrecking work, handling heavy machinery, rigging and other heavy lifting. Made in 15, 25, 35 and 50 ton capacities. Available in sizes to meet the need. Heights from 22" to 27".

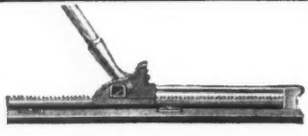
TRENCH BRACES

Duff-Norton trench braces are safe and economical for all trench and excavation jobs. Strong construction and quick installation. Complete with pipe in lengths from 16" to 60"—with extentions of from 6" to 10" according to size.



LOW HEIGHT SCREW JACKS

For bridge building, locomotive shops, shipyards and heavy construction work. Ideal for use in short heights and cramped areas where high lifting is required. Capacity—50 tons. Heights, 16" and 16½".



PIPE FORCING JACKS

Plumbing contractors, public utility companies, city water and sanitation departments find this double acting ratchet jack unique for laying or removing pipe in places of uneasy access. Capacity—15 tons. Length, 8 feet. Travel of cage, 7 feet.

PUSH AND PULL JACKS

Used by contractors, drillers, riggers, railroads, shipyards and industrial plants. Powerful for pushing apart or pulling together steel plate, sheet, beams, etc. Used with chains, hooks or pipe sleeves for increased range of applications. Capacities—10 to 15 tons. Overall lengths—24" to 38" or longer if desired.

These are just a few of the many types of Duff-Norton Jacks available for every construction requirement. Write today for Catalog 203 which illustrates and describes our complete line.

THE DUFF-NORTON MANUFACTURING CO.

PITTSBURGH, PA.

See your Associated Equipment Distributor

FIRE EXTINGUISHER—Small, compact, with trigger-quick acting valve feature, new midget fire extinguisher is called Alfco Speedex. Contents weigh only 3⅝ lb. but expand upon release to 450 times their contained volume. It is only 3 9/16 in. in diameter with overall length of 22 in. It is operated by quick acting squeeze-type valve which releases carbon dioxide extinguishing agent by palm pressure. Speedex carbon dioxide gas is non-poisonous, non-corrosive and odorless. It is non-conductor of electricity and will not freeze at any climatic temperature. It is heavier than air and will not support combustion.—**American-LaFrance-Foamite Corp., Elmira, N. Y.**

FORK TRUCK—New fork-type power industrial truck with elevating reach of 18 ft. above floor level is unusually compact, with increased speed and flexibility for maneuvering and lifting and lowering loads. New truck picks up loads on its bare fork or on pallets. Its capacity is rated at 4,000 lb., for lifting to height of 11 ft. and 3,000 lb. to 18 ft. It is electrically driven, with three separate motors—one for traveling, one for operating elevating mechanism, and one for tilting upright columns. Tilting limit is 15 deg. backward and 5 deg. forward from vertical.—**Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 14, Ohio.**

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JETTING PUMPS

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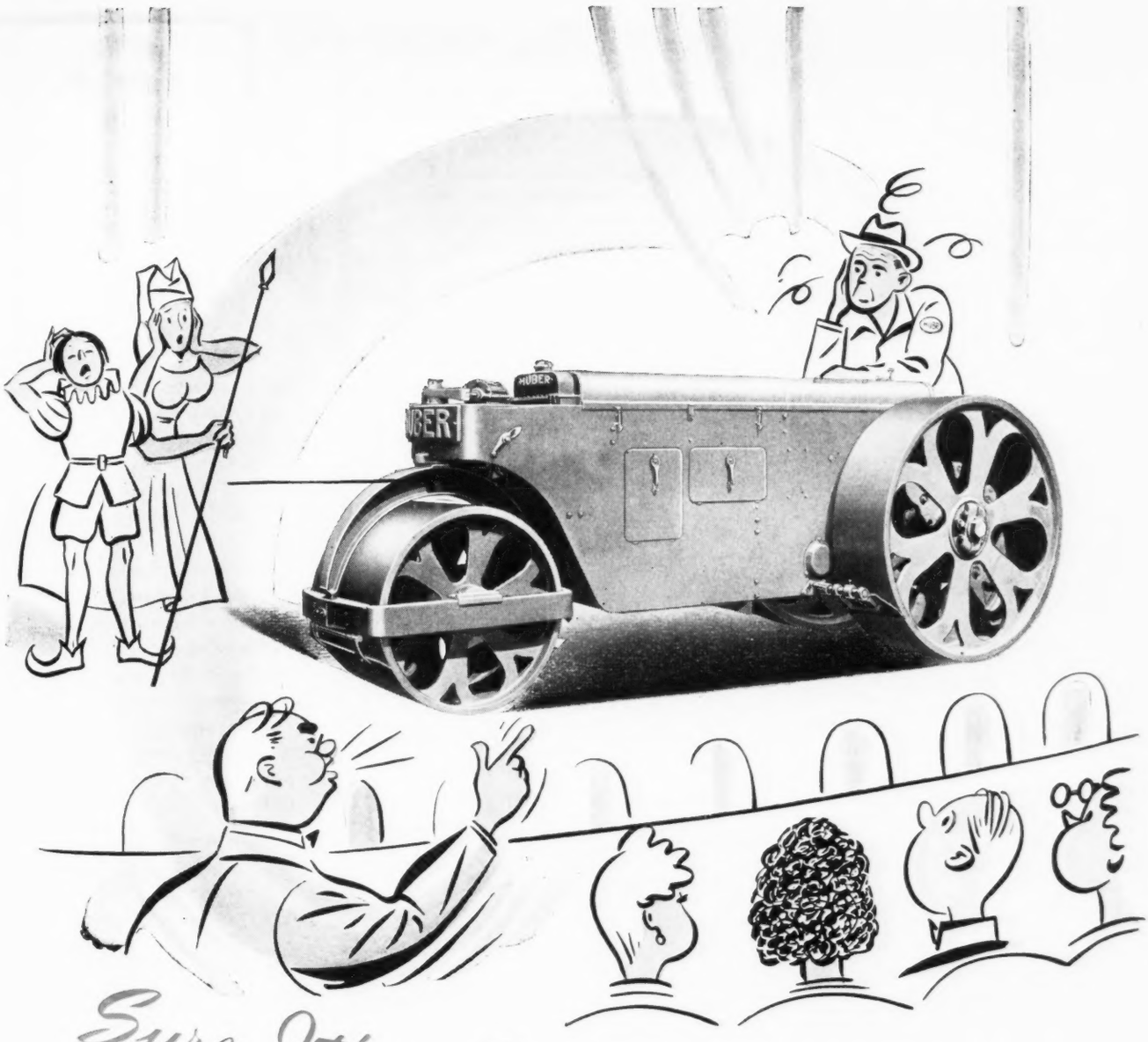

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. . . . . but a **HUBER ROAD ROLLER** is not a means of entertainment. It is an honest-to-goodness working tool that gets "top billing" in any contractor's language—and plenty of "curtain calls" for performance, economy, and service. This is your "cue" to check the many features of Huber Rollers that will make a "hit" with you.

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HUBER

3 Wheel • Tandem

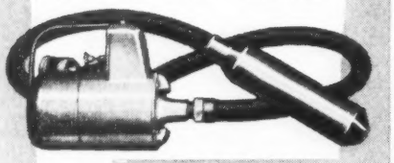
ROAD ROLLERS *and* MAINTAINERS

DEPENDABLE

BREAKDOWNS ON BIG CONCRETE JOBS COST MONEY. VIBERS ARE DEPENDABLE.

VIBER
Concrete Vibrators

Jobs can be completed ahead of schedule, with VIBER'S unmatched speed-9,500 RPM, *in concrete*. Send for Viber Catalog.



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New PUBLICATIONS From MANUFACTURERS

The catalogs and bulletins reviewed below will keep you posted on latest developments in construction equipment and materials available for your use

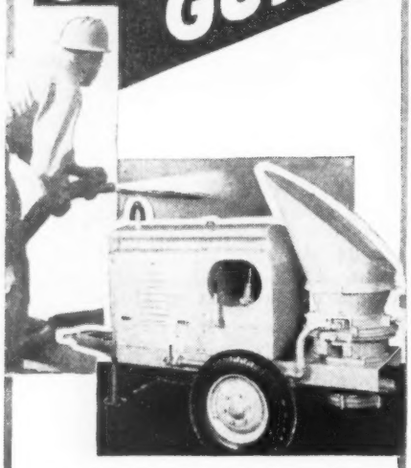
WEEKLY WALL CALENDAR — (12x20-in. calendar-catalog) Fifty-two weekly pages feature standard items like tracing paper, ruling pens, drafting machines and furniture, as well as new drafting room furniture ready for 1947. Engineering data are given in back. **—Frederick Post Co., P.O. Box 803, Chicago, Ill.**

CONTRACTORS' PUMPS — (Illustrated looseleaf folder) provides pictures, descriptions, capacity charts and specifications for new line of self-priming centrifugal pumps in 1½-, 2-, 3-, 4-, 6-, and 8-in. models. Also covered are Humdinger single and double diaphragm pumps, vertical self-priming caisson pumps, high pressure jetting pumps, plunger pressure pumps, and electric drive pumps.—**Ralph B. Carter Co., Hackensack, N. J.**

DRY BACK BOILERS—(Illustrated, 12-p. booklet) "Scotch Dry Back Boilers" is now available in four languages. It gives considerable descriptive and operational information about this type of equipment.—**Dominion Bridge Co., Ltd., Lachine, Que., Canada.**

DIESEL ENGINE COOLING SYSTEMS—(20-p. booklet) Valuable addition to reference library of anyone interested in stationary diesel engine efficiency and lower operating cost. Profusely illustrated with pictures, diagrams and blueprints, it shows how water jacket scale, overheating, costly break-downs and insurance rates can be greatly reduced or entirely eliminated.—**Binks Manufacturing Co., 3114-40 Carroll Ave., Chicago 12, Ill.**

JETCRETE GUN



The ultimate in pneumatic placing of concrete! Simpler . . . faster . . . more economical! Model 200 illustrated uses separate compressor—has 4-speed transmission. 2 other models smaller and larger. Write for new bulletin.

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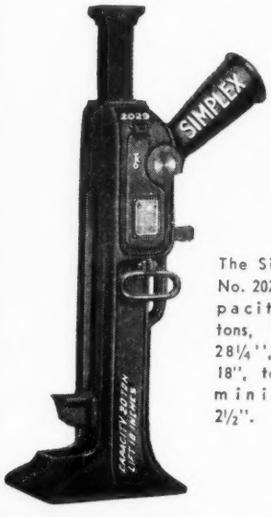
Quite a number of fistic heavyweight champions have come and gone since Simplex No. 2029 Jack made its bow. Through the years this rugged 20-ton Jack has been the choice of the construction field for building moving, bridge work, moving machinery and heavy engineering operations. Lifts its full 20 tons with greater ease and speed than many jacks of less capacity. No. 2029 has all the well-known Simplex safety features, which lend security to otherwise hazardous lifting jobs. Widely used in pairs, in lieu of cranes, for handling loads exceeding 20 tons.

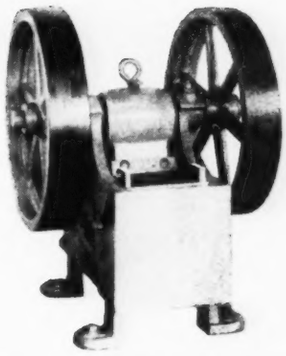
Templeton, Kenly & Co.
Chicago 44, Ill.



The Simplex No. 2029. Capacity 20 tons, height 28¼", lift 18", toe lift minimum 2½".

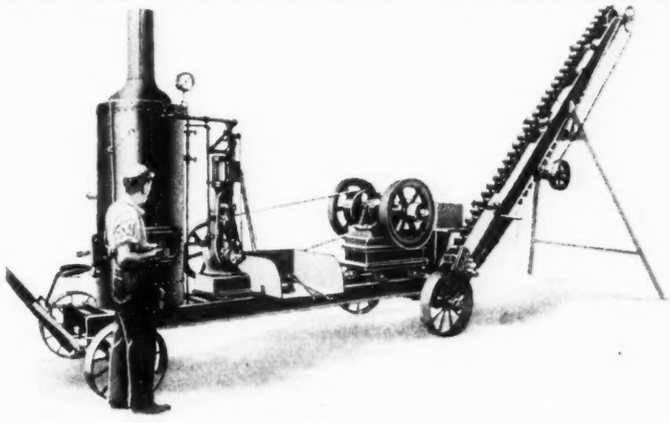
SIMPLEX
WORLD'S MOST COMPLETE LINE OF
JACKS
LEVER
SCREW
HYDRAULIC

Look to the Leader—UNIVERSAL



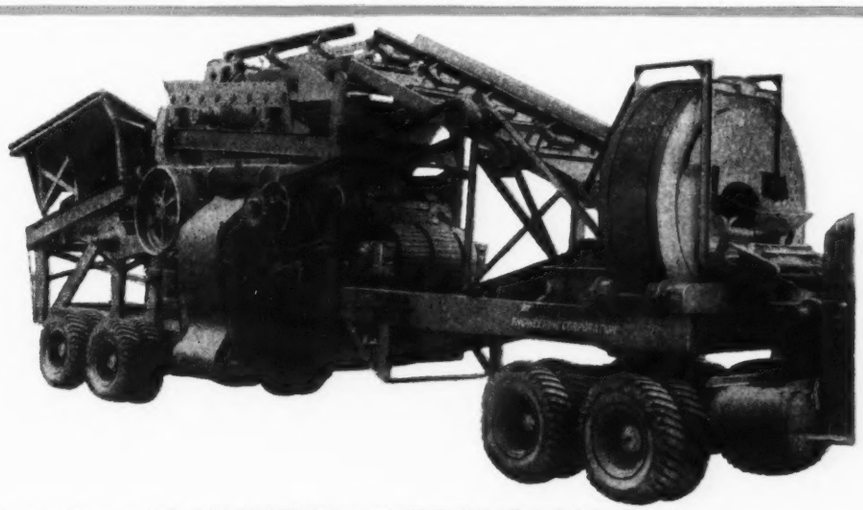
1906

First with the overhead eccentric principle in jaw crushers. Originated by UNIVERSAL, *this principle is today the standard of the industry.*



1910

The First UNIVERSAL *Portable Crusher, complete with overhead eccentric jaw crusher, power, bucket elevator and truck.*



1947

First in Engineering with UNIVERSAL *"STREAM-FLO" Design, resulting in higher capacities, lower operating costs, and greater profits. The* UNIVERSAL *293-Q Pacemaker Quarry Plant.*

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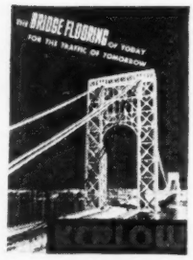
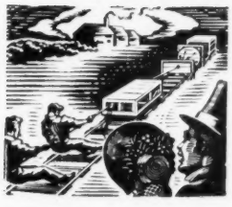


OPEN STEEL FLOORING — (40-p. catalog) Contains latest engineering information on design and selection of grating and stringers in accordance with 1944 standard specifications of highway bridges of American Association of State Highway Officials. It concisely explains increasing importance, usefulness and benefits of this type of bridge flooring, and fully describes various Kerlow designs and their applications for open flooring and filled slabs, with dimension charts, complete specifications, selection and installation data for each design. Also included are descriptions and detailed data on Kerlow splices, drain grates, trench grates, expansion joints, sidewalks, safety steps, and industrial applications of Kerlow gratings for platforms, structures, floors, walkways, stairways, etc.—**Kerlow Steel Flooring Company, 222 Culver Ave., Jersey City 5, N. J.**

INDUSTRIAL SAFETY CHARTS— Issued monthly, as part of safety program of Division of Labor Standards, U. S. Department of Labor, safety charts for 1946 cover: Punch presses, gas welding and cutting, hand trucks, hammers, traveling cranes, scaffolds, metal shears and brakes, freight elevators, cold chisels, electrical hazards for electricians, compressed gas cylinders and jointers and planers. Priced at 5 cents each or $3.75 per 100, copies are available from **Superintendent of Documents, Government Printing Office, Washington 25, D. C.**

COLOR CONDITIONING — (32-p. booklet in full color) Illustrates and describes years of research and practical experience with color to increase production, improve seeing conditions and create better working environment. It makes clear fundamental principles on which color conditioning is based. "Three-Dimensional Seeing" treatment of machines is depicted with photographs of actual installations and Safety Color Code for Industry is outlined. Color Conditioning is shown at work in plants of several well-known companies. Coordinated functional color program for entire plant is illustrated in double-page cutaway drawing. — **Finishes Division, E. I. duPont de Nemours & Co., Inc., Dept. M-6, Wilmington 98, Del.**

CONFIDENCE . . . how much is it worth?



IN 1841, two years before the first telegraph line was installed in this country, and when there were but 27 states in the Union, John August Roebling was inspired with the idea of making a new kind of rope of unheard of strength and flexibility. His confidence in his idea caused him to risk everything he had on the development of his new rope.

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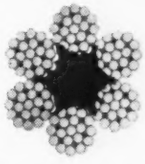

Roebling entrusts your confidence in Roebling and Roebling products to the performance of its "Blue Center" Steel Wire Rope. It is the best rope Roebling knows how to make. It is available as preformed or non-preformed, in a complete range of sizes and constructions to meet a great variety of operating conditions. Its uses are almost unlimited and its performance is consistently economical.

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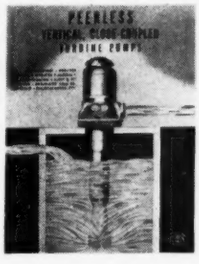
6305 W. BURNHAM STREET, MILWAUKEE 14, WIS.

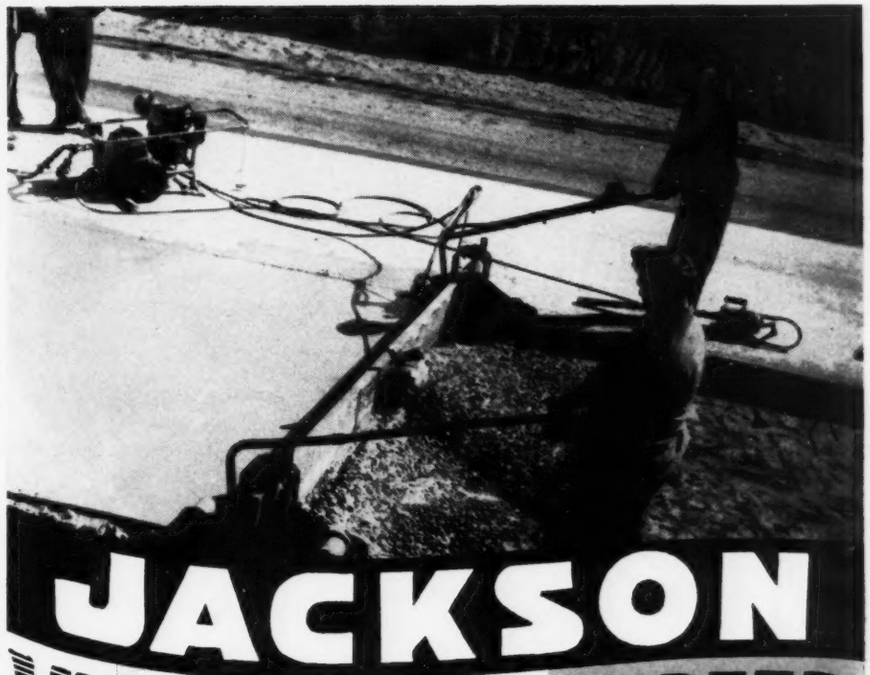
WATER METER—(8-p. bulletin) Provides detailed description of arctic-type Pittsburgh disk meter. Full-scale cutaway photos, reproduced in natural colors with identifying captions keyed to major parts, present construction features graphically. Subassembly features are described through isometric and sectional drawings with accompanying descriptive text. Technical data, dimensions and list prices are tabulated. Three-page section is devoted to repair parts. Exploded views in which all operating parts are shown exactly as they are assembled in meter case simplify ordering of replacement units and serve as assembly guide for repair man. Meters in sizes ⅝-, ¾-, and 1-in. are described. — **Pittsburgh Equitable Meter Division, Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.**



PUMPS — (20-p. bulletin) Describes application of vertical close-coupled turbine to industrial, municipal, engineering and agricultural installations. It is illustrated with cutaway views of pump, schematic diagrams of suggested methods of pump installation in various services, in addition to installation photographs of these pumps in wide variety of industrial applications. Details of pump engineering, construction and operation were fully described and illustrated.—**Peerless Pump Division, Food Machinery Corp., 301 West Avenue 26, Los Angeles 31, Calif.**

SEWAGE PUMPS—(32-p. data book, revised edition) Gives complete construction details, dimensions and installation and operating data on vertical and horizontal sewage pumps, self-priming sewage pumps, sewage ejectors, and single suction sludge pumps for general service and special liquors. Included are typical specifications covering pump nonclogging raw sewage pump.—**Buffalo Pumps, Inc., Buffalo 5, N. Y.**

FOUNDATION PANEL—(8-p. folder) Describes system of forms for construction of foundations and small homes for all types of commercial structures where story height forms are desired.—**Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 51, Ill.**



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Above: Tilted for second pass.

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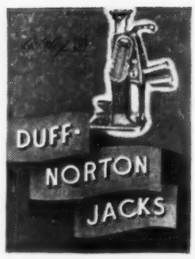
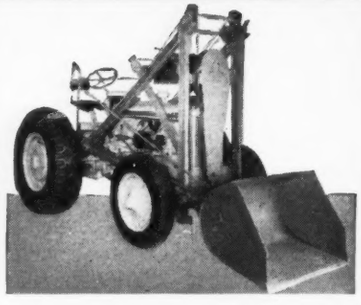


LIFTING JACKS — (40-p. catalog) Gives complete descriptions, data and specifications for every jack in company's line, including various types of ratchet jacks, screw jacks, air motor operated jacks, and hydraulic jacks. Also shown are details on improved automatic lowering mechanism, improved journal jacks, and new 50-ton general purpose screw jack of inverted type. Application data and illustrations for various types are given.—**Duff-Norton Mfg. Co., Box 1889, Pittsburgh 30, Pa.**

INDUSTRIAL EXHAUSTERS—(32-p. bulletin) Describes new heavy-duty steel plate fan with completely welded housing, adjustable and reversible. Removable front and back plates are interchangeable and large enough in diameter so that rotor can be removed through side of fan. Three rotors are available, one for air-handling, two for material. Rating for all models are published in full.—**Buffalo Forge Co., Buffalo 5, N. Y.**



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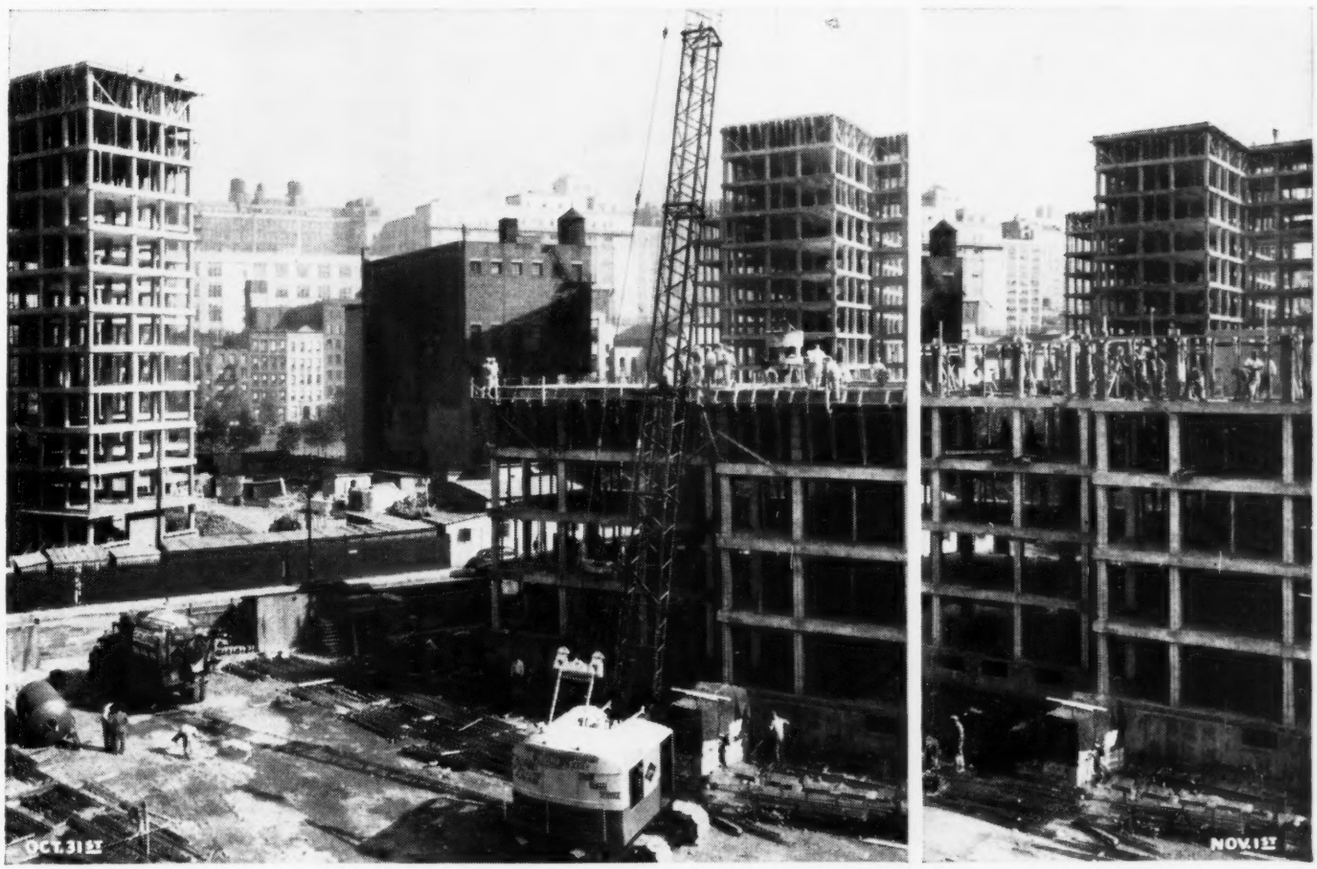

(Left) 11 AM, October 31st, pouring concrete floor; (right) same building 24 hours later—floor forms stripped, column forms being re-erected! John Lovejoy Elliott Houses, Chelsea District of New York City, for the New York City Housing Authority.
General Contractors—H. R. H. Construction Corp. **Sub-Contractors**—Knickerbocker Concrete Arch Construction Co., Inc. **Architects**—Brown & Lescaze

Only two of the four units of this vitally needed housing project could be started because of a shortage of key materials.

Knickerbocker, anxious to speed operations, agreed to place two sets of forms on each despite the increased cost and the difficulty of handling them. But when materials became available for the third and fourth units, they immediately decided to use Lehigh Early Strength Cement, thus enabling them to place concrete one day and strip the forms the next morning . . . with only one set of forms required for each of the four units. Result? A clear saving of three days per floor throughout the balance of the job! Smoother operations and other worthwhile savings accrued too, as the schedule gathered momentum.

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Air-Cooled **Engine**
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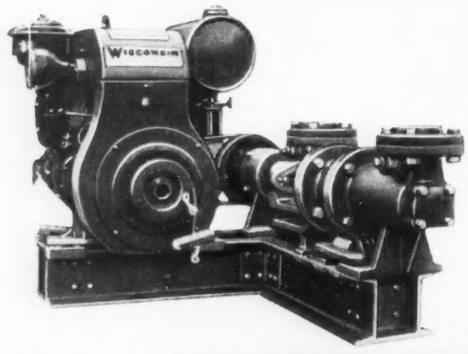

Typical of the many diversified applications of Wisconsin Air-Cooled Engines in engineering service is the unit here illustrated . . . designed for use in the Andes Mountains of South America, for pumping drilling mud on a geophysical shot hole drilling rig. It is so designed and constructed that it can be readily disassembled in three sections and transported by donkeys. A structural aluminum frame was used . . . and a Model AEH 4-cycle, single cylinder Wisconsin Air-Cooled Engine was selected for operating the Model B4-4 Moyno Pump . . . based on such vital considerations as light weight, extreme compactness, heavy-duty dependability and complete adaptability to trouble-free operation in any locality, at any altitude.

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EQUIPMENT MEN
and Their Companies

Gilmore Hiett has become advertising and sales promotion manager of the Gorman - Rupp Co., pump manufacturers of Mansfield, Ohio. He had previous experience as advertising manager for refrigerators and home freezers with the Westinghouse Electric Corp. and was advertising manager of the Mansfield News-Journal and the Marion (Ohio) Star.

A complete new setup in the manufacture of its diesel engines is announced by Lister-Blackstone, Inc., Milwaukee 3, Wisconsin. All production has been moved to a new modern plant equipped with the most up-to-date tools and machines. There will be almost complete concentration on the production of straight diesel engines. A modern parts department has been established at 1568 W. Pierce St., Milwaukee and the office is at 740 N. Plankinton Ave., Milwaukee 3, Wis.

G. V. Leece, vice-president of Gardner-Denver Co., has been appointed general sales manager, located at Quincy, Ill. He joined the company in 1922 and for the past two years has been vice-president in charge of the export division.

The Allied Steel Products, Inc., Cleveland, Ohio, announces the appointment of **John G. Fitzpatrick,** Indianapolis, as direct factory agent in Ohio, Indiana, Illinois and Michigan. The company manufactures Bulldog grip-lug, Mango repointer bars, "Excelloy" hard srufacing materials, etc.

Joseph T. Ryerson and Son, Inc., steel distributors, have announced the completion of an addition to the structural shop office building at their Chicago plant, resulting in added convenience and improved service to customers. The new construction provides 6,500 additional square feet of floor space.

LIMA enters 1947 the pacemaker among shovels, draglines and cranes. Efficient high speed operation of LIMA machines continues to smash performance records everywhere. In brick plants, quarries, sand and gravel pits, coal and metal mines, lumber, general construction, etc., LIMA is giving the kind of service that users want—service that steps up production and delivers big output at low cost. LIMA shovels are built in capacities ranging from 3/4 yard to 5 yards and crane capacities range from 13 tons to 100 tons. Bulletins sent on request.

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division
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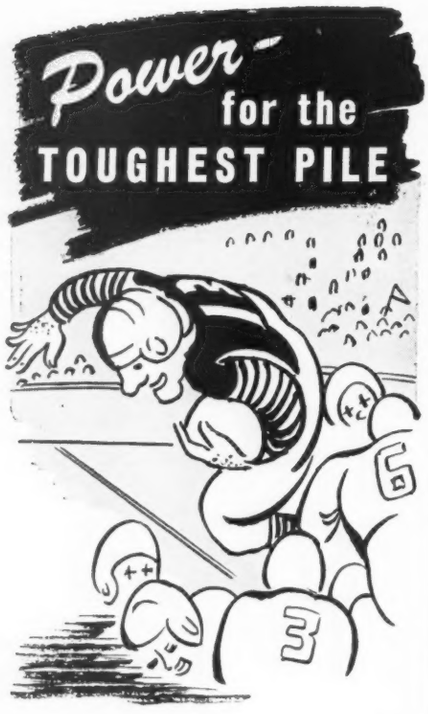
Still Again in 1947

THE LIMA DIAMOND FOR 75 YEARS AN EMBLEM OF QUALITY WORKMANSHIP

LIMA

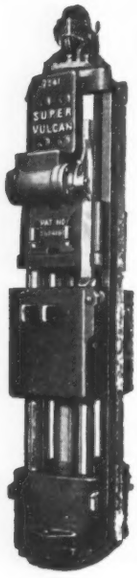
LIMA SHOVELS DRAGLINES and CRANES



WARRINGTON-VULCAN

Single-Acting Steam

PILE HAMMERS



RUGGED strength, positive action and power plus make favorites of fullbacks and the Single-Acting Warrington-Vulcan. There's drive in Vulcan's impact. There's speed and efficiency in its operation.

It sinks any kind of pile—wood, steel, or concrete. Power is applied with a moderate frequency of low velocity blows from a relatively heavy ram. Medium steam pressure produces rapid, regular and continuous action. Maintenance and mechanical costs are minimized through sturdy construction and simple design, with working parts exposed for easy accessibility.

Write for details on this dependable pile driver that has delivered cost-saving, proved-in-action power since 1887.

VULCAN IRON WORKS
Since 1852
331 North Bell Avenue
Chicago 12 ---Illinois

To provide expanded and speedier service to all users of cemented carbide tipped cutting tools in the Allentown-Bethlehem-Easton area in Pennsylvania, Carboloy Co., Inc., of Detroit, Mich., has appointed the Wm. H. Taylor & Co., Inc., 256 Hamilton St., Allentown, Pa., as an authorized distributor. It handles cutting tools, abrasives, general mill supplies, pipe, and electrical apparatus. **C. S. McElyea,** sales manager, will head up the Carboloy operation at Wm. H. Taylor & Co. and **C. R. Musselman** will act as carbide specialist.

Desota Foundry, Inc., Mansfield, La., has changed its name to Hendrix Manufacturing Co., Inc.

General Panel Corp., of New York, has entered into an agreement with Celotex Corp. for West Coast distribution of General Panel houses. Under license from General Panel, the California corporation this week launched a $22,000,000 building program for the Pacific coast. Production schedule calls for 10,000 four-room houses for West Coast distribution during 1947.

ARMSTRONG
CONSTRUCTION TOOLS

ARMSTRONG
DROP FORGED
CONSTRUCTION RATCHETS

The ARMSTRONG Reversible Ratchet Construction Wrenches are made of steel thruout—the Ratchets are drop forged, the Nut Socket machined from special analysis bar steel. All parts except the handle are hardened. The spindle of the Ratchet is of "wide open" design—permits bolt to pass thru the Ratchet so that nuts can be run any distance along bolt and securely set with one setting. 24" or 36" Ratchets take square or hexagonal sockets for nuts of from 1" to 2 3/16" dia. or 1 1/8" to 3 1/8" dia., respectively.

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—a basic, well-integrated treatment including latest developments

This new book provides the design engineer and analyst with a sound, advanced reference on the mechanics of materials, including up-to-date material and references, and supplying a logical, broad and basic analysis of the subject. The book emphasizes throughout the three fundamental tools of stress analysis — statics, geometry, and the properties of the material. The topics covered include the relationships among stresses and strains at a point; theories of failure; axial loading; stress concentrations; thick-walled cylinders; torsion of non-circular members; unsymmetrical bending; curved beams; shear center; stresses near concentrated loads; and buckling of panels, sheets and thin-walled members.

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Scores of helpful diagrams, charts, drawings and photographs illuminate the text material. Eight valuable tables supply such data as Torsion Constants for a Rectangular Bar, Typical Column Formulas, etc.

Hundreds of topics presented include:

—graphical solution by the Mohr Circle
—evaluation of principal stresses from strains measured on a rosette
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K. V. (Ken) Turner has been appointed assistant sales manager of LaPlant-Choate Manufacturing Co., Inc. of Cedar Rapids, Iowa. He started work for LaPlant-Choate as a blueprint clerk in the engineering department in 1938 and since then his experience has included service work, export sales, field engineering research, and district sales representative in northeastern United States.

The Lincoln Electric Co., Cleveland, Ohio, announces the appointment of R. W. Sharp as district manager and sales engineer of its new Indianapolis office at 3343 Central Avenue. Mr. Sharp joined the company in 1939 and has acquired broad experience in welding engineering.

L. J. Renner has been appointed mid-continent wire rope sales manager for the Wickwire Spencer Steel division of The Colorado Fuel and Iron Corp. He will be located at 1502 Fort Worth National Bank Bldg., Forth Worth 2, Texas. He previously handled the sale of wire rope in the Chicago district office.

Metalweld, Inc., 26th and Hunting Park Ave., announce that they have been appointed exclusive distributors in the eastern Pennsylvania, South Jersey and Delaware area for the entire Worthington - Ransome "Blue Brute" line. This new construction equipment includes concrete pavers, truck mixers and agitators, portable mixers, pneumatic placing equipment, grout injectors and concrete guns. **S. John Oechsle** heads the Metalweld organization; **John Norris Childs** is vice president, and **M. L. McIntire** is sales manager of the construction equipment division.

Restricted during war years, escorted plant tours through the Peoria, Ill., factory of Caterpillar Tractor Co. have been reinstated. During the last complete year in which such trips were permitted Caterpillar had a total of 19,662 visitors.

Louis M. Kuilema, formerly district sales manager at the Cincinnati office of Pennsylvania Salt Manufacturing Co. has been placed in charge of the Wisconsin territory as district sales manager. He is located at 20 N. Wacker Drive, Chicago.

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One suggestion taken from it may save you thousands of dollars.

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Down Hill ALL THE WAY!

Sterling barrows wheel so easily, they make it seem like going down hill all the way. Lightweight . . . well-balanced . . . equipped with modern, anti-friction bearings, Sterlings relieve the operator of fully 80% of the load. That's why they are the preferred barrow in all types of industries.

The demand for Sterlings continues to exceed the supply. Deliveries, however, will be stepped up as rapidly as conditions permit.

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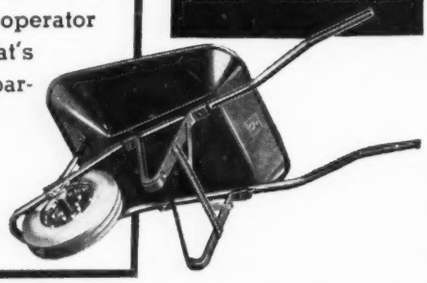

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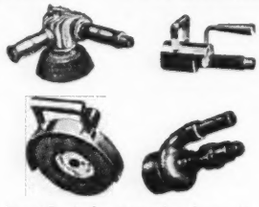
Gas or Electric Concrete Vibrators (Catalog No. 689)



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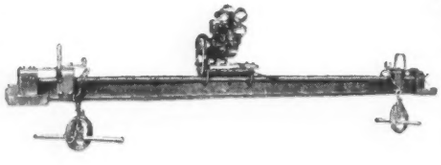

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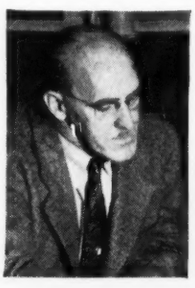
The American Manganese Steel Division of American Brake Shoe Co., Chicago Heights, Ill., announces three major appointments: **A. R. Sittig** manager of manganese steel sales and **E. L. Quinn** assistant vice-president in charge of welding products, both at Chicago Heights; and **E. J. Nist** as assistant vice-president, with offices at 230 Park Ave., New York, N. Y.

R. G. LeTourneau, Inc., Peoria, Ill., announces the moving of its eastern sales office and the appointment of a new central sales manager. The office is located at 1026 17th St., N. W. 412-413 Defense Bldg., Washington 6, D. C. **O. A. (Jack) Williams** (left) was named to the eastern sales managership after serving LeTourneau as a district sales representative in 1944. **W. B. (Bill) Worden,** (right) district sales and service representative for LeTourneau in southern California and Arizona for the past four years, has been named central sales manager.



Byron Jackson Co. announces the acquisition of the Butte Pump & Motor Works in Chico, Calif. The acquired business was established in 1925 as The Gas & Electric Service Co. and the name was changed to Butte Pump & Motor Works in 1934. The business acts as a dealer of Byron Jackson pumps, and deals in the rewinding of motors, electrical wiring, servicing of neon signs and sale of appliances. **A. F. Vonnegut** will assume charge as manager, with no other changes in personnel.

Arlington W. Clark, Toronto, has been appointed general manager of Snap-on Tools of Canada, Ltd. Mr. Clark has served since 1934 as managing director of Black & Decker Manufacturing Co., Ltd. In his new position he will be in charge of all sales, production and administrative functions of the home office and factory at Long Branch, Ont., and will direct product distribution to Snap-on's six Canadian warehouses.

BARCO MAKES A MAN A

GIANT

The Barco Portable Hammer has never been more in demand by owners and operators alike. This hard-hitting, tireless machine gives a worker super-strength . . . multiplies individual work capacity. Eleven special tool attachments enable Barco to handle a wide range of jobs. It's a time-saver . . . a job speeder.

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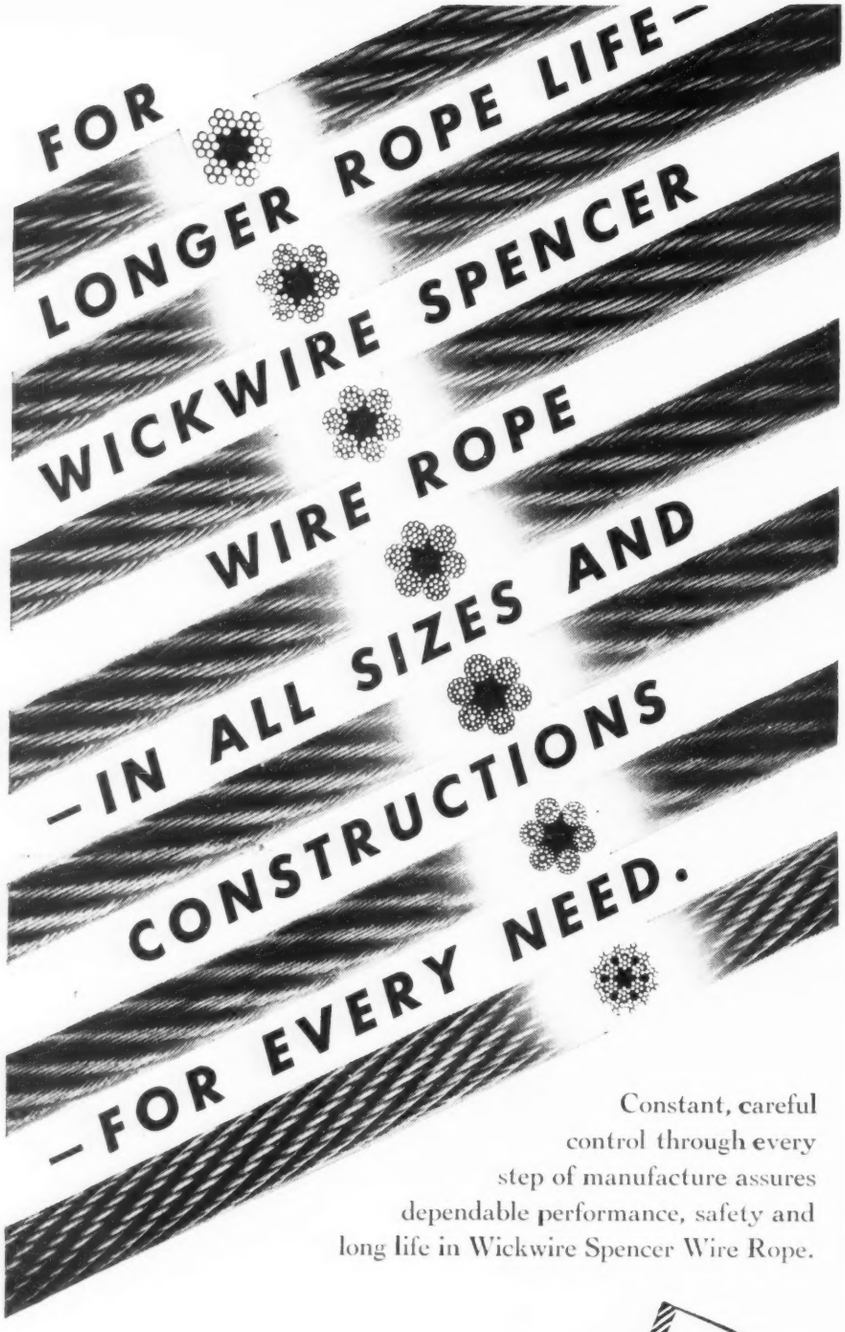

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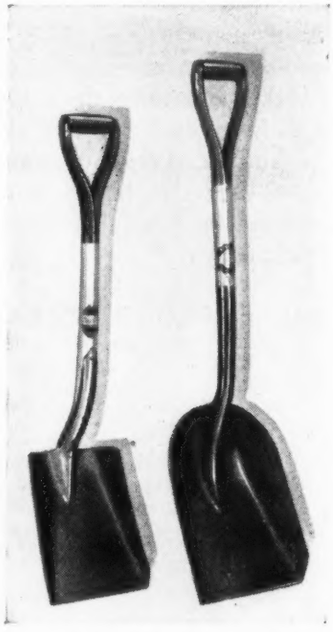
Appointment of Wilson A. Wright as manager of sheet and strip sales of Republic Steel Corp. has been announced. He succeeds **John W. Carpenter** who has resigned due to ill health. Mr. Wright was first employed by Republic in Youngstown in 1930.

The Silvercote Products Co., Chicago, has appointed The Richkraft Co., Chicago, as sole distributor of Silvercote reflective insulation papers in the building and construction fields. Distribution will be handled through The Richkraft Co.'s national sales organization as a companion product with Richkraft building papers, Richkure concrete curing compounds, and Richlume waterproof, insulating roof coating.

Harold W. Davis is retiring after 36 years' service with the American Hoist & Derrick Co. **Raymond J. Dervey** of St. Paul has been appointed manager of the company's Pittsburgh office. **Ralph Thomson** is leaving the Pittsburgh office to take over Mr. Davis' position as manager of the company's offices in New York.



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Plants: New Castle, Ind.; Chicago, Ill.; Kalamazoo, Mich.

Patterson Sales Co., El Paso, Tex., engineering sales representative for machinery and industrial equipment, has been appointed distributor of the Aridifier in Arizona, New Mexico, Mexico and Central America by Logan Engineering Co., 4900 Lawrence Ave., Chicago, Ill.

S. V. Saginor, for the past six years general manager of the Davey Compressor Co., Kent, Ohio, has been named vice-president and a director of the Robinson Clay Products Co., Akron, succeeding **Thomas Rockwell,** who is retiring as vice-president and treasurer after 42 years. **Paul V. Robinson,** formerly secretary, now has the combined post of secretary-treasurer.

Appointment of Robert C. Friedly as construction specialist for Nelson Sales Corp. of Lorain, Ohio, has been announced. Mr. Friedly's background includes several years of experience as an independent contractor and sales engineer for construction materials. He served as an officer in the U. S. Army, joining the Nelson organization shortly after his recent discharge. His initial assignment will be to establish complete application specifications for Nelson stud welding in construction.

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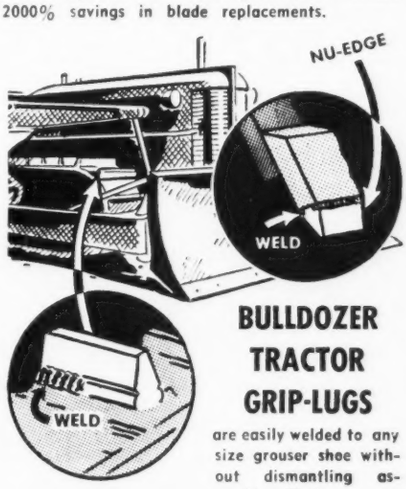
The Bulldozer Blade Nu-Edge Bar is butt-welded to new or worn blade and welding bead covered with a thin layer of hard-surfacing electrode—Afford-2000% savings in blade replacements.



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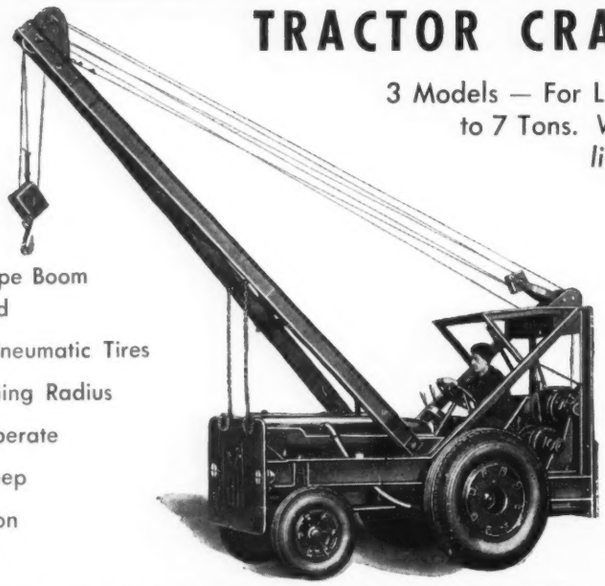

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A new company, Tractomotive Corp. has been formed to manufacture equipment for industrial wheel and crawler tractors. **V. M. Dobeus,** formerly chief engineer, Springfield works, tractor division of Allis-Chalmers Co., is president. **Paul B. Cochran,** formerly general manager of Buckeye Traction Ditcher Co., is vice president and treasurer. The plant and engineering department now operate at Findlay, Ohio.

Elmer A. Mulson, for the last ten years sales engineer with the Barney Machinery Co. of Pittsburgh, has been named manager of the Pittsburgh district office of the Baldwin Locomotive Works. Besides diesel and steam locomotives, Mr. Mulson will represent the company in its sales of testing machines, industrial presses, marine propellers, and alloy castings. His office is in the Union Trust Bldg.

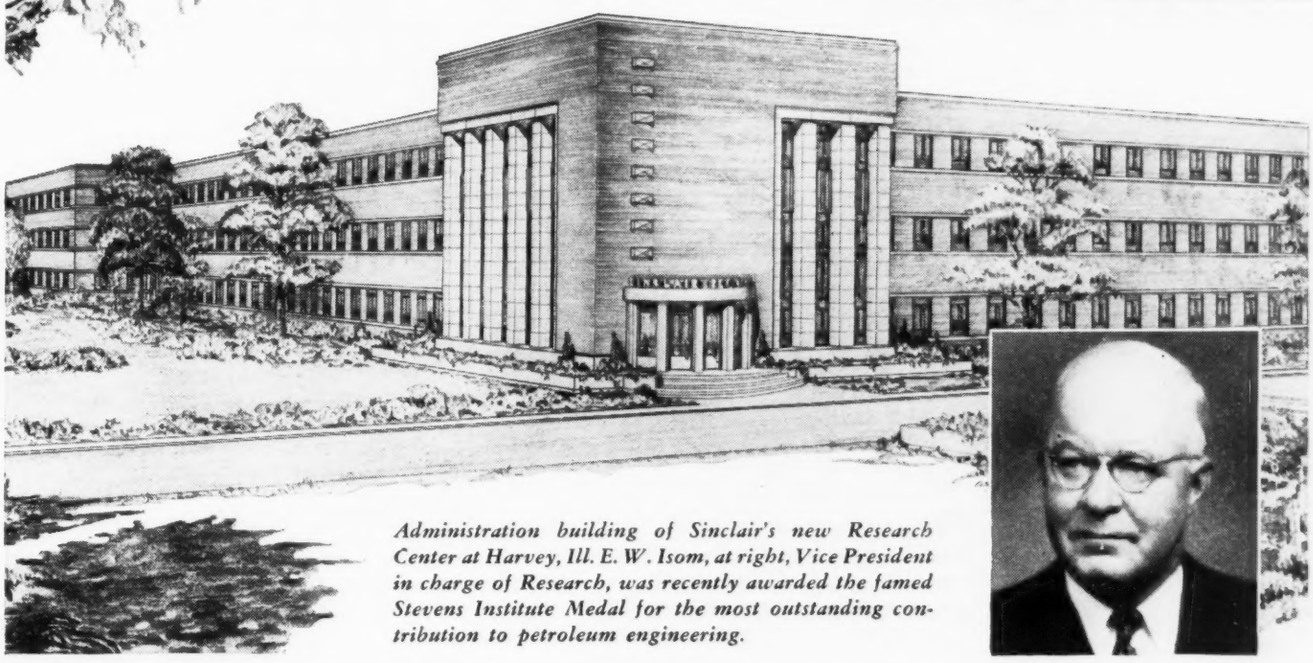
Roy A. Shipley, president of the National Fireproofing Corp., Pittsburgh, Pa., was elected president of the Structural Clay Products Institute, national association of brick and tile manufacturers, at the Institute's recent convention in New Orleans. Mr. Shipley, a member of the organization's board of directors for three years, has served as chairman of the association's research committee and also is a member of the American Ceramic Society. Other officers elected at the convention were: vice president, **Joseph A. Brown,** president of the Baltimore Brick Co., Baltimore; treasurer, **W. Gardner Long,** treasurer of the New England Brick Co., Boston; and secretary, **J. J. Cermak** of Washington, D. C.

The Insley Manufacturing Corp., Indianapolis, makers of power shovels, cranes and concrete placing equipment, has announced the appointment of the Conners Equipment Co., 854 Leader Bldg., as distributors for northern Ohio. **J. T. Conners,** head of the new firm, has spent 25 years in the construction machinery field. For the past 20 years he has been associated with the Thew Shovel Co. of Lorain, O., in various sales capacities.

The Idaho Portland Cement Co., located at Inkom, Ida., will soon double its 1,200,000 sacks per year capacity. Plans for expansion are nearly complete with work expected to get under way as soon as machinery is available.

Outstanding Ability

. . . to solve your lubrication problems



Administration building of Sinclair's new Research Center at Harvey, Ill. E. W. Isom, at right, Vice President in charge of Research, was recently awarded the famed Stevens Institute Medal for the most outstanding contribution to petroleum engineering.

Sinclair is completing a new $4,000,000 petroleum research and development laboratory at Harvey, Ill. This great research center — to be the most modern and best equipped in the industry — climaxes more than 30 years of consistent achievement in the development of superior products for the solution of your most difficult lubrication problems.

The outstanding skill and vast technical knowledge of recognized experts in the petroleum field will continue to serve you at Harvey as they have for so many years at East Chicago.

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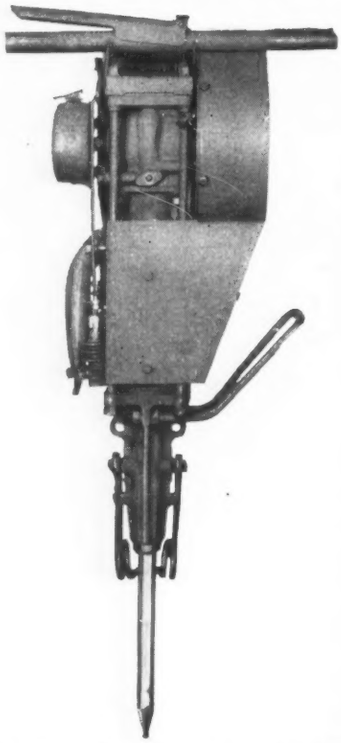

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A five-year research project to promote safe, economic and efficient highway transportation entered its initial phase during the current school year at the University of Wisconsin College of Engineering. The project, supported by a grant accepted in 1945 from The Four Wheel Drive Auto Co., is under the direction of **Archie H. Easton.** The primary objectives of the research project are to make basic studies of truck and highway design for safety, economy and efficiency; to compare four-wheel drive trucks with single-axle drive trucks through experimental tests; to provide advanced study in the fundamentals and techniques of truck and highway design and to make other miscellaneous studies.

M. A. Clements has been appointed service manager for the western division of Caterpillar Tractor Co. at San Leandro, Calif. Mr. Clements joined the Caterpillar organization in 1936. Following a two-year engineering apprentice course he spent a year in the company's research laboratory, joining the service department in December, 1939. In 1943 he became service engineer and, a year later, was named central division service manager.

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George P. Torrence, executive vice-president of Link-Belt Co. since July 1, 1946, has become president of the company, succeeding **William C. Carter.** In addition to his experience with Link-Belt Co., Mr. Torrence was general manager of Rayon Machinery Corp., from 1936 to 1944, and president of Cleveland Pneumatic Tool Co. from 1944 to 1946. His experience with Link-Belt dates back to 1911.

Western Machinery Co., announces the appointment of **L. T. McGuire** as manager of its Salt Lake City branch. He has served as a designing engineer, sales engineer, service engineer and sales and district manager. His experience includes 13 years with the Byers Machinery Co. and 5 years with the Harnischfeger Corp.

Tractor Conn

(*Continued from page* 103)

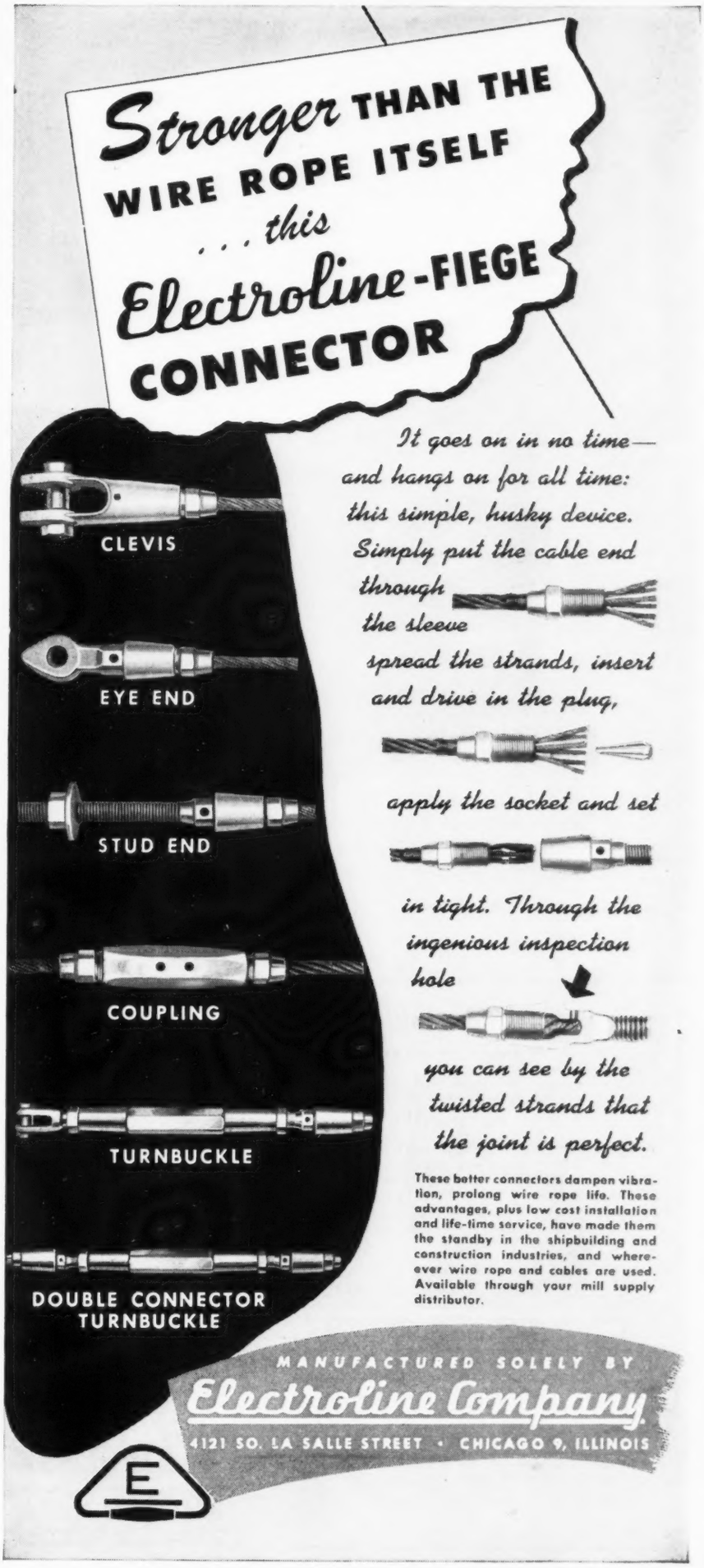
into, does not, however, usually refer to such bill, but requires the work to be completed as a whole according to certain plans and specifications, and although such bill is used by the bidders in estimating the amount of their bid, there is no implied agreement on the part of the owner that the bill of quantities is correct and, in case such bill is incorrect, the contractor is not entitled to compensation, as for extras, for additional work and materials necessary for the completion of the work.' "

"Is that English or American law you read last?" Conn queried.

"Good American law, laid down in Haydnville Min. Co. vs Art Inst., 39 Feb. 484, and there are Minnesota and New York cases to the same effects."

"There was also a statement on the bidding drawings that the information was not guaranteed and that prospective bidders were to make their own deductions as to the conditions liable to be met," Conn added.

"If you'd told me that in the first place I needn't have looked in a book," the attorney declared, "for that statement was the same as saying: 'Let the bidder beware.' "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157-10

25KVA Electric
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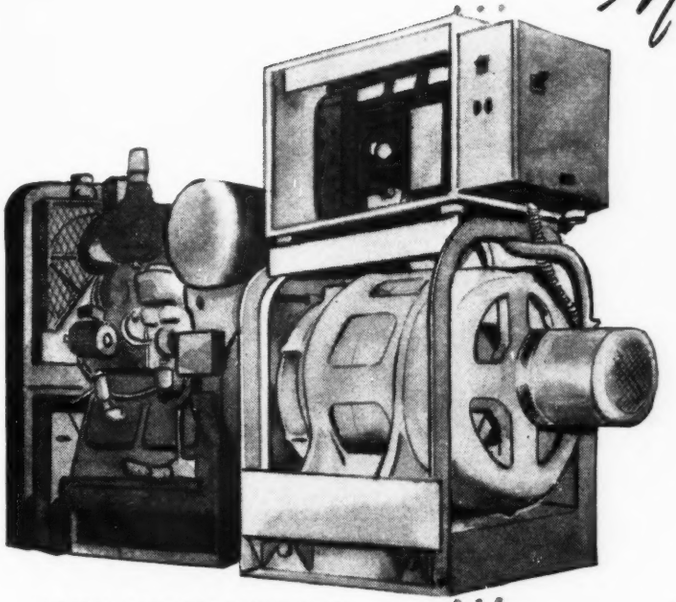
Mobile and Portable



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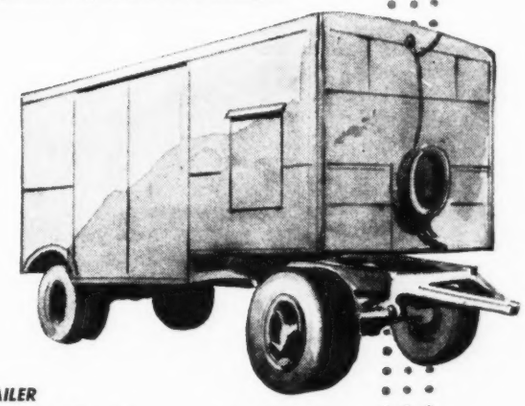

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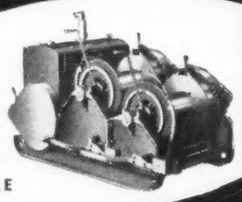

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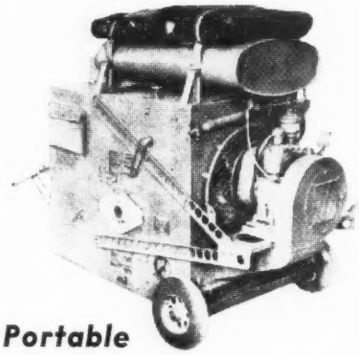

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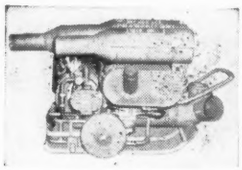

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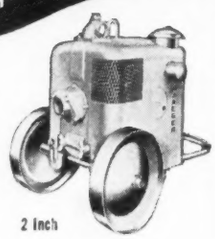

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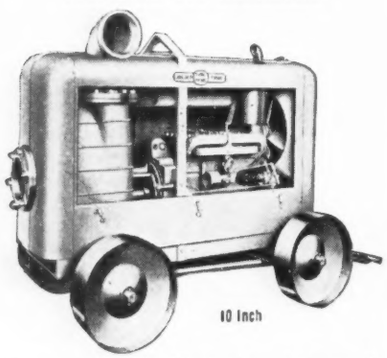

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Worthington-Ransome Construction Equipment Division

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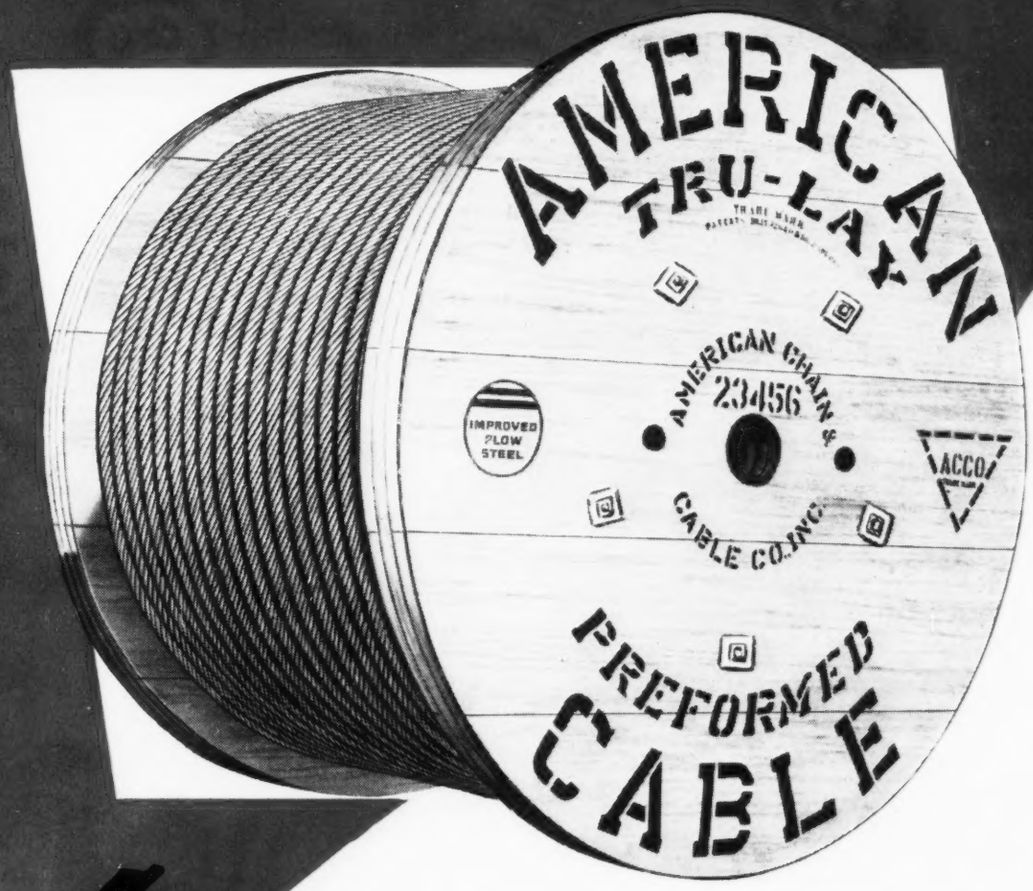

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AMERICAN CHAIN & CABLE

In Business for Your Safety

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The transmission shows a marked advance over usual design. Enclosed water pump clutch requires no adjustment and at no time is there any need for manual lubrication. A separate engine clutch, two speeds forward and reverse, and multiple disc clutches assure easier starting, a wider performance range and smoother operation.

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These are but a few of the reasons why the Blue Brute Hi-Up is setting a new high in truck mixer performance — and offering time-saving, trouble-free production of better concrete at lower cost.

Get the whole story from your nearby Worthington-Ransome dealer, or write for Bulletin No. 221.

R6-7

KNOW YOUR BLUE BRUTES

Your Blue Brute Distributor will be glad to show you how Worthington-Ransome construction equipment will put your planning on a profitable basis. His name is listed on Page 164

RANSOME EQUIPMENT

Pavers, Portable and Stationary Mixers, Truck Mixers, Pneumatic Placing and Grouting Equipment and Accessories.

WORTHINGTON EQUIPMENT

Gasoline and Diesel Driven Portable Compressors, Rock Drills, Air Tools, Self-Priming Centrifugal Pumps and Accessories.

BUY BLUE BRUTES

Truck Mixers
Capacities:
2, 3, 4½ cu. yds.

Portable Mixers
Capacities:
3½, 6, 11, 16, 28 cu. ft.

Big Stationary Mixers
Capacities:
28, 56, 84, 126 cu. ft.

Pneumatic Placer
Capacity:
7, 14, 28 cu. ft.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.